GENERAL ELECTRIC
GENERAL ELECTRIC INFORMATION SYSTEMS ITALIA

PTR 100-101 SUBSYSTEM

Paper tape Reader

0897932 J
0897935 F
0897925 E
0897930 D
0897931 E
0897933 N
0897934 B

DESCRIPTION
INSTALLAT.
MAINTEN.
PARTS

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PTR 100-101

Paper tape Reader

GENERAL ELECTRIC
GENERAL ELECTRIC INFORMATION SYSTEMS ITALIA

SOTTOSISTEMA PTR 100-101
PTR 100-101 SUBSYSTEM

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29.1.1970

DESCRIPTION

A	ISO 7+1	paarig
B	IBM FRIDEN	onpaarig
C	ISO 6+1	onpaarig

1

Honeywell
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PAPER TAPE READER SUBSYSTEM

PTR 100 - 101

Description

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1. GENERAL CHARACTERISTICS

1.1 - INTRODUCTION

The PTR 100-101 is a subsystem that reads off data from punched tape then forwards the information to the CPU.
Housed is a self-standing cabinet, the subsystem is composed of the following units:

- Electronics (controller + D.O.E. = Device Oriented Electronics)
- Operator panel
- A.C. input filter
- Mechanics. After having read the tape, this unit transmits the data to the controller and oversees to the correct paper tape feed and take-up operations.

1.2 - GENERAL

1.2.1 - Performance

Read and tape take-up speeds are:

a) Square hole (Audit Code) PTRs:

- . read speed = 423 chrts/sec.
- . rewind speed = 656 chrts/sec.

b) Round hole PTRs:

- . read speed = 500 chrts/sec.
- . rewind speed = 775 chrts/sec.

Unpunched tape rolls have a max. outer diameter of 204 mm. (corresponds to a tape length of approx 300 m.).

Tape thikness must be according to the international ECMA standards, that is to say:

$$\boxed{0.1 \pm 0.005 \text{ mm.}}$$

The minimum inner tape roll diameter must be 51 mm. (2").

The media (paper tape) must also comply to the ECMA standards.

Physical characteristics of tapes that may utilized on this subsystem are illustrated in the following paragraphs.

1.2.2 - Type of Tapes

1) - 20.5 mm. Tape

Figure 1.1. illustrates the physical dimensions of 20.5 mm. tapes which are punched in Audit code.

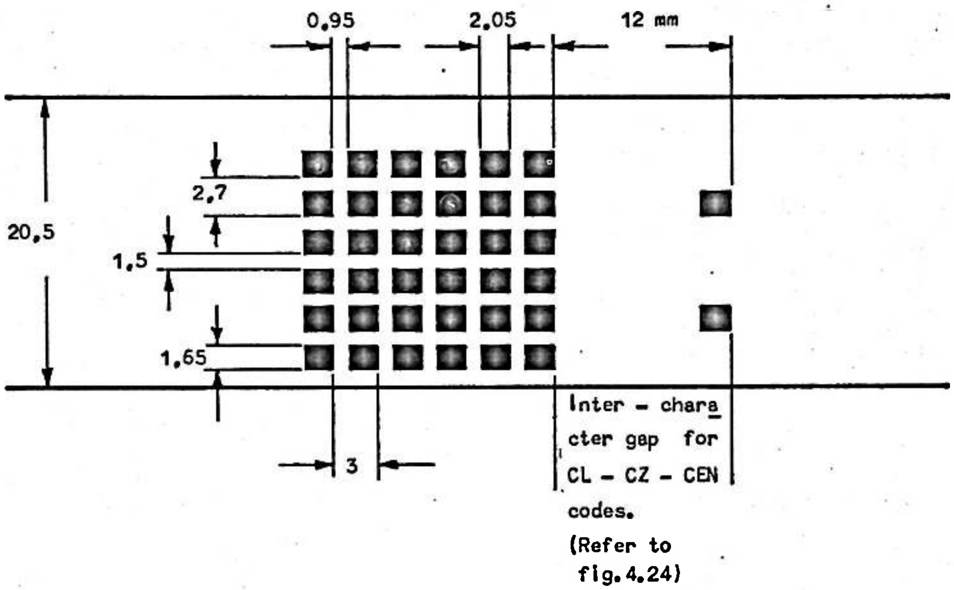


Fig. 1.1 - 20.5 mm. Tapes

2) - 1" Tape

One inch wide tapes (25.4 mm.) have the following physical dimensions:

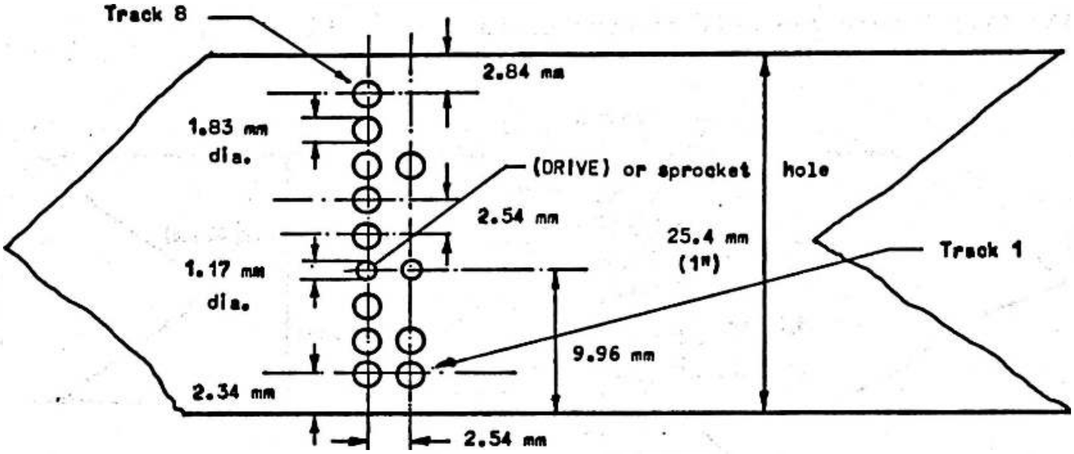


Fig. 1.2 - 1" Tapes

The tape drive ("sprocket") hole is physically positioned on the same axis of the track holes.
Should the 1" tape be punched on 7 tracks + sprocket, rather than on 8 tracks + sprocket, the unused track will be the eighth.
The remaining tape parameters will remain unchanged.

One inch wide tapes may be punched in one of the following codes:

- ISO 7	8 tracks + sprocket
- ISO 6	7 tracks + sprocket
- IBM	8 tracks + sprocket
- FRIDEN	8 tracks + sprocket

3) - 11/16" Tape

The sprocket hole on these is again positioned on the axis of the other track holes. Refer to fig. 1.3.

The 11/16" tape can only be punched in telegraphic code.

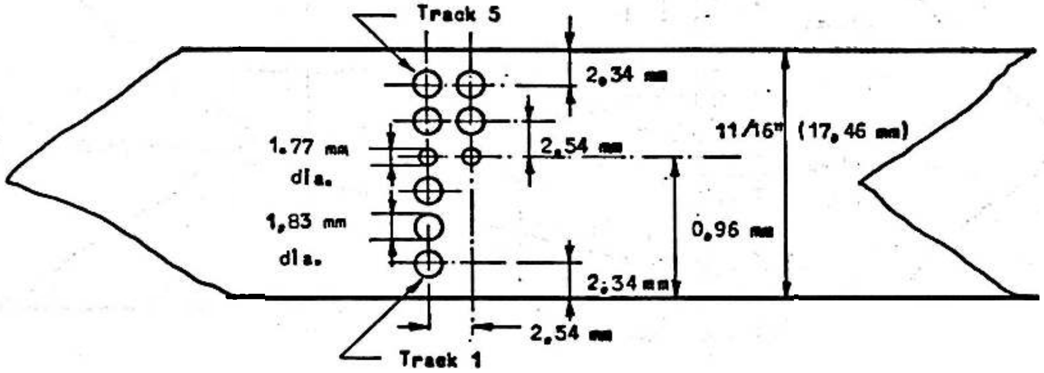


Fig. 1.3 - 11/16" Tapes

4) - 7/8" Tapes

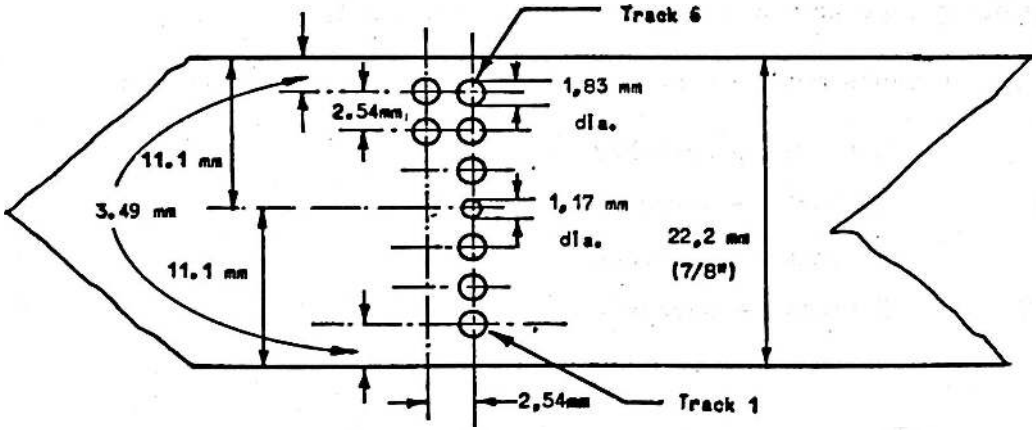


Fig. 1.4 - 7/8" Tape

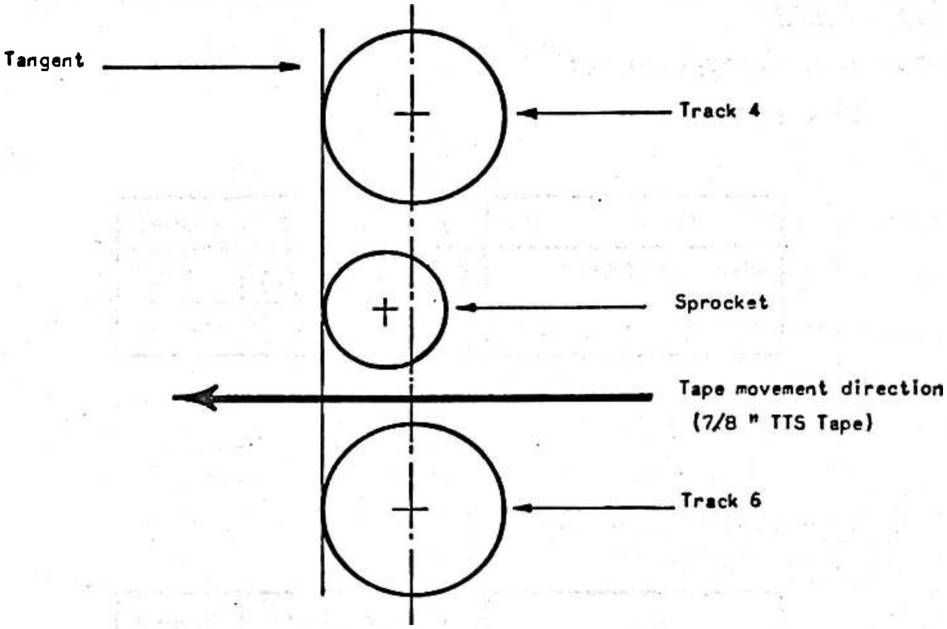


Fig. 1.5 - Sprocket Hole Position

The 7/8" Tape is punched in TTS code.

1.2.3 - Power Supply

There are two basic versions of this subsystem:

1) - European version: 220 V 3 phase ± 10% 50 Hz (47.5 to 52.5).

2) - U.S. version : 208 V 3 phase with neutral ± 10% 60 Hz (58.5 to 60.5).

The DC supply foresees a +20 V supplied by the CPU to which the subsystem is connected.

1.2.4. - Absorptions

The subsystem a.c. absorption is:

1) - European version:

PHASE	X	Y	Z	Neutral
MAX-ABSORPTION-AMP	1.5	0.5	1.6	-
Cos φ	0.5			

2) - U.S. version:

PHASE	X	Y	Z	Neutral
MAX ABSORPTION-AMP	2	0.6	1.5	1.5
Cos φ	0.5			

DC Absorption 7 Amp.

Power dissipation 140 W.

1.2.5 - Compatibility

The subsystem may be connected to the G100 line CPUs (i.e.: 4001 - 115 1/2 - 130 etc.) either directly or through the MPA (multi-peripheral adaptor).

1.3 - PHYSICAL CONFIGURATION

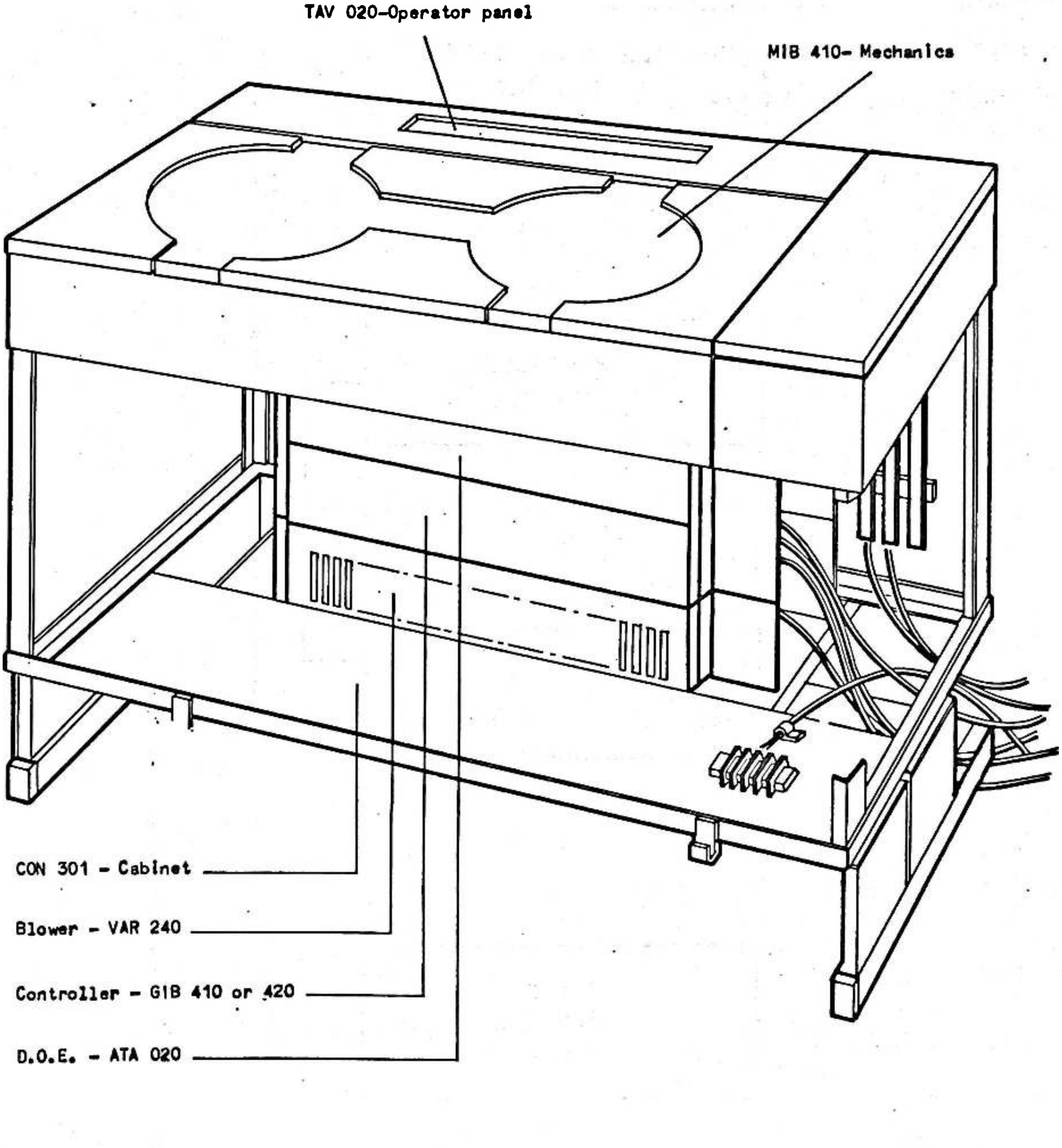


Fig. 1.6 PTR 100-101

1.3.1 - Dimensions

Subsystem dimensions are:

- Height : 780 mm.
- Width : 835 mm.
- Depth : 495 mm.
- Weight : 95 Kg.

1.4 - ELECTRICAL CONFIGURATION

1.4.1 - PTR 100 Cable Layout

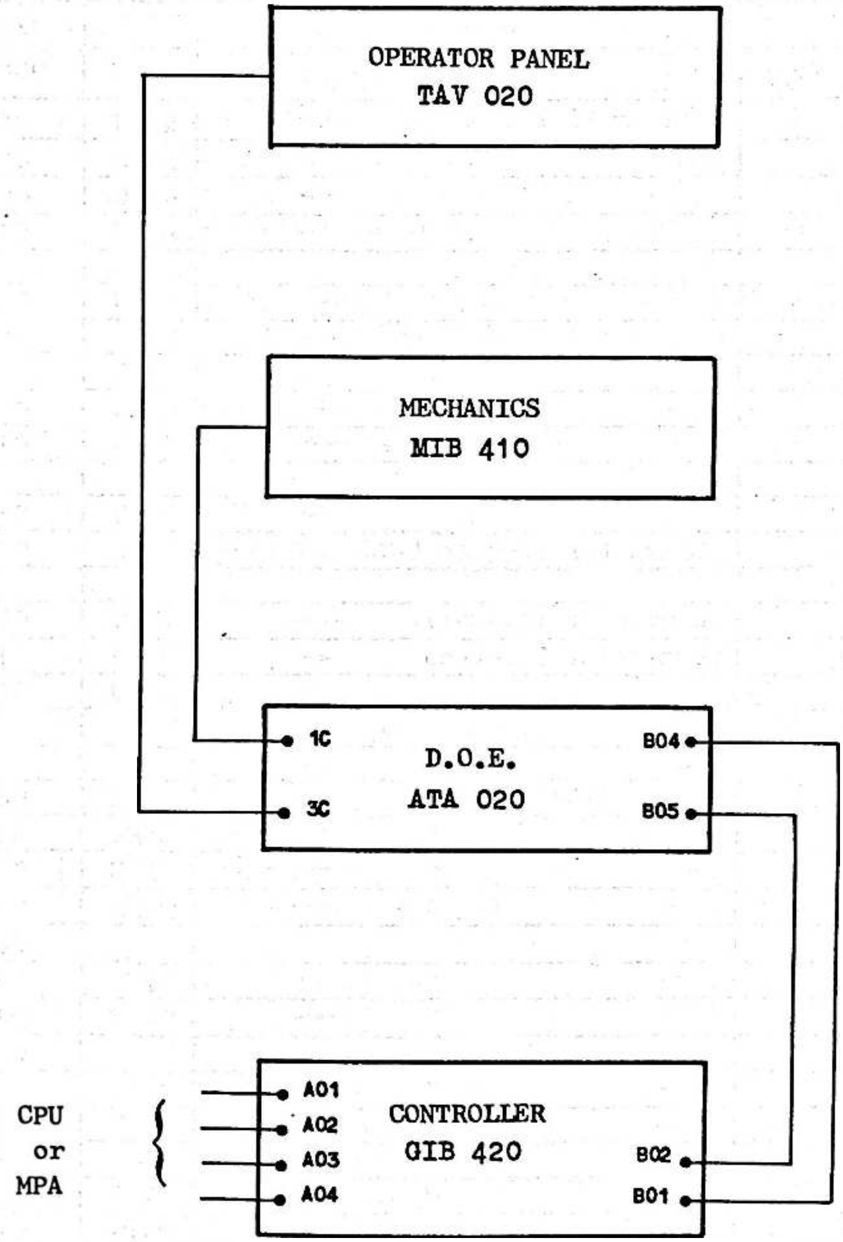


Fig. 1.7 - Cable Connections.

1.4.2 - PTR 100 Controller/Processor Interface

CPU			INTERCONNECTION	CONTROLLER GIB 420		
		SIGNAL			ROW-A	
CONN.	PIN	NAME	MEANING	NAME	CONN.	PIN
			Output Bits A →	AIFU	01	01
			B →	BIFU	01	02
			C →	CIFU	01	03
			D →	DIFU	01	04
						05
			E →	EIFU	01	06
			F →	FIFU	01	07
						08
			G →	GIFU	01	09
			L →	LIFU	01	10
						11
			M →	MIFU	01	12
			Character request (+20Conn.)←	TE10	01	13
						14
			Character Accompany →	TU20	01	15
			Character Received ←	TE30	01	16
				ZERO	01	17
			Input Bits A ←	AIFE	02	01
			B ←	BIFE	02	02
			C ←	CIFE	02	03
			D ←	DIFE	02	04
					02	05
			E ←	EIFE	02	06
			F ←	FIFE	02	07
					02	08
			G ←	GIFE	02	09
			L ←	LIFE	02	10
					02	11
			M ←	MIFE	02	12
			Character Request →	TU10	02	13
					02	14
			Character Issue ←	TE20	02	15
			Characters Received →	TU30	02	16
				ZERO	02	17

CPU			INTERCONNECTION	CONTROLLER GIB 420		
		SIGNAL			ROW-A	
CONN.	PIN	NAME	MEANING	NAME	CONN.	PIN
			Ext. Clear →	CAGU	03	01
			End of Transmission →	FINU	03	02
			Repeat Command →	CONU	03	03
			Command Issue →	VICU	03	04
					03	05
			End of Transmission ←	FINE	03	06
			Controller Available ←	PEOO	03	07
					03	08
			Error Indication (at+20) ←	SEGE	03	09
			Sequence end (at+20) ←	FISE	03	10
					03	11
			Oper.panel Indication ←	SECO	03	12
			Controller Error-On-Line ←	EGOL	03	13
					03	14
					03	15
					03	16
				ZERO	03	17
			Selected Unit →	PUOO	04	01
			Mech. Unit Available (Gnd) ←	MAPE	04	02
			End of Tape ←	TESE	04	03
			Out of Service (Alert) ←	MARE	04	04
					04	05
			Mech.Unit On ←	MATE	04	06
			Interruption (at+20) ←	INES	04	07
					04	08
			Full Stacker (at+20) ←	CAPE	04	09
					04	10
					04	11
			Interruption (at+20) ←	IGOL	04	12
			1st Unit (at +20) ←	NU10	04	13
					04	14
			2nd Unit (at+20) ←	NU20	04	15
			3rd Unit (at+20) ←	NU30	04	16
				ZERO	04	17

1.4.3 - PTR 101 Cable Layout

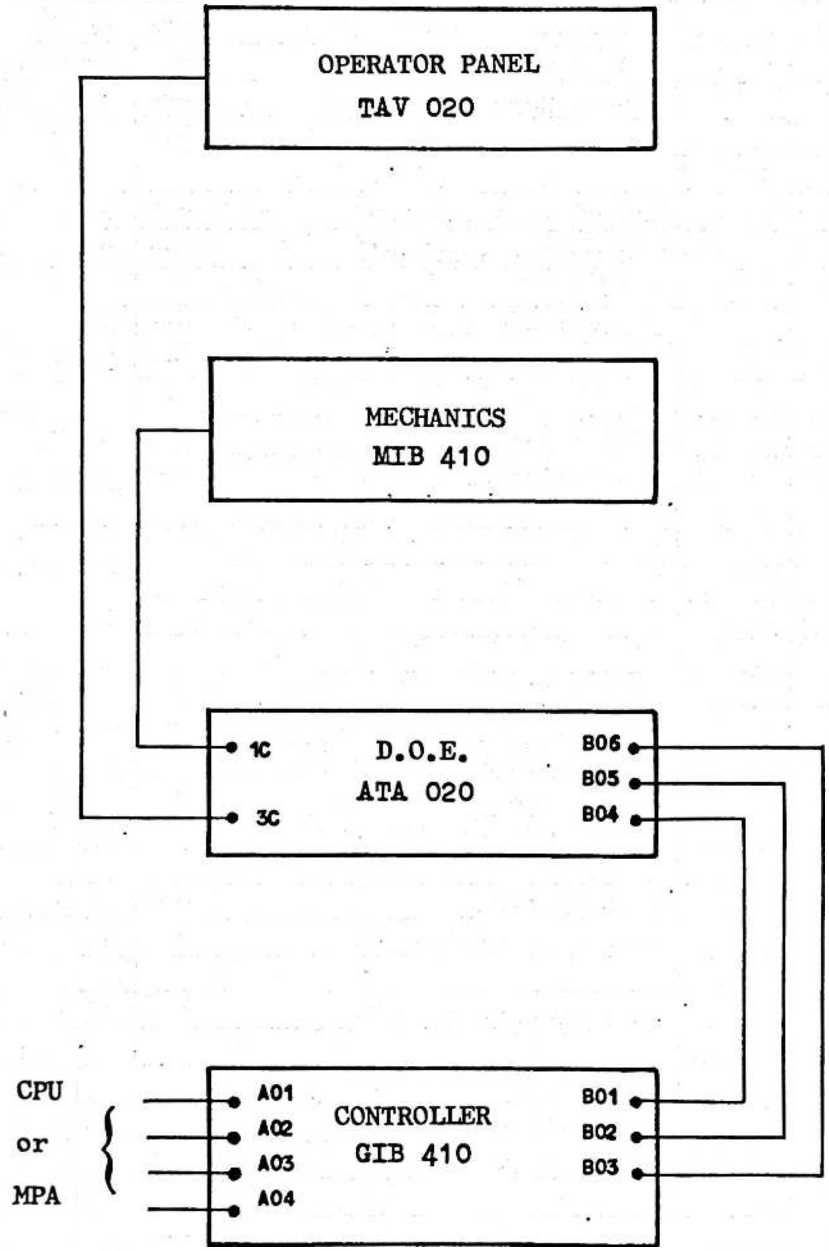


Fig. 1.8 - Cable Connections

1.4.4 - PTR 101 Controller/Processor Interface

CPU			INTERCONNECTION	CONTROLLER GIB 410		
		SIGNAL			ROW-A	
CONN.	PIN	NAME		NAME	CONN.	PIN
			Output Bits A →	AIFU	01	01
			B →	BIFU	01	02
			C →	CIFU	01	03
			D →	DIFU	01	04
					01	05
			E →	EIFU	01	06
			F →	FIFU	01	07
					01	08
			G →	GIFU	01	09
			L →	LIFU	01	10
					01	11
			M →	MIFU	01	12
			Character Request (+20 conn) ←	TE10	01	13
					01	14
			Character Accompany →	TU20	01	15
			Character Received ←	TE30	01	16
				ZERO	01	17
			Input Bits A ←	AIFE	02	01
			B ←	BIFE	02	02
			C ←	CIFE	02	03
			D ←	DIFE	02	04
					02	05
			E ←	EIFE	02	06
			F ←	FIFE	02	07
					02	08
			G ←	GIFE	02	09
			L ←	LIFE	02	10
					02	11
			M ←	MIFE	02	12
			Character Request (Gnd) →	TU10	02	13
					02	14
			Character Issue ←	TE20	02	15
			Character Received (Gnd) →	TU30	02	16
				ZERO	02	17

CPU			INTERCONNECTION	CONTROLLER GIB 410		
		SIGNAL			ROW-A	
CONN.	PIN	NAME	MEANING	NAME	CONN.	PIN
			Ext. Clear →	CAGU	03	01
			End of Transmission →	FINU	03	02
			Repeat Command →	CONU	03	03
			Command Issue →	VICU	03	04
					03	05
			End of Transmission ←	FINE	03	06
			Controller Available ←	PEOO	03	07
					03	08
			Error Signal ←	SEGE	03	09
			End of Sequence (+20 conn) ←	FISE	03	10
					03	11
			Oper.panel Indication ←	SECO	03	12
			Controller Error-On line ←	EGOL	03	13
					03	14
					03	15
					03	16
				ZERO	03	17
			Selected Unit →	PUOO	04	01
			Mech. Unit Ready (Gnd) ←	MAPE	04	02
			End of Tape ←	TESE	04	03
			Out of Service (Alert) ←	MARE	04	04
					04	05
			Mech. Unit On ←	MATE	04	06
			Interruption (+20conn) ←	INES	04	07
					04	08
			Full Stacker (+20 conn) ←	CAPE	04	09
					04	10
					04	11
			Interruption ←	IGOL	04	12
			1st Unit (+20 conn) ←	NU10	04	13
					04	14
			2nd Unit (+20 conn) ←	NU20	04	15
			4th Unit (+20 conn) ←	NU30	04	16
				ZERO	04	17

1.5 - MECHANICAL CONFIGURATION

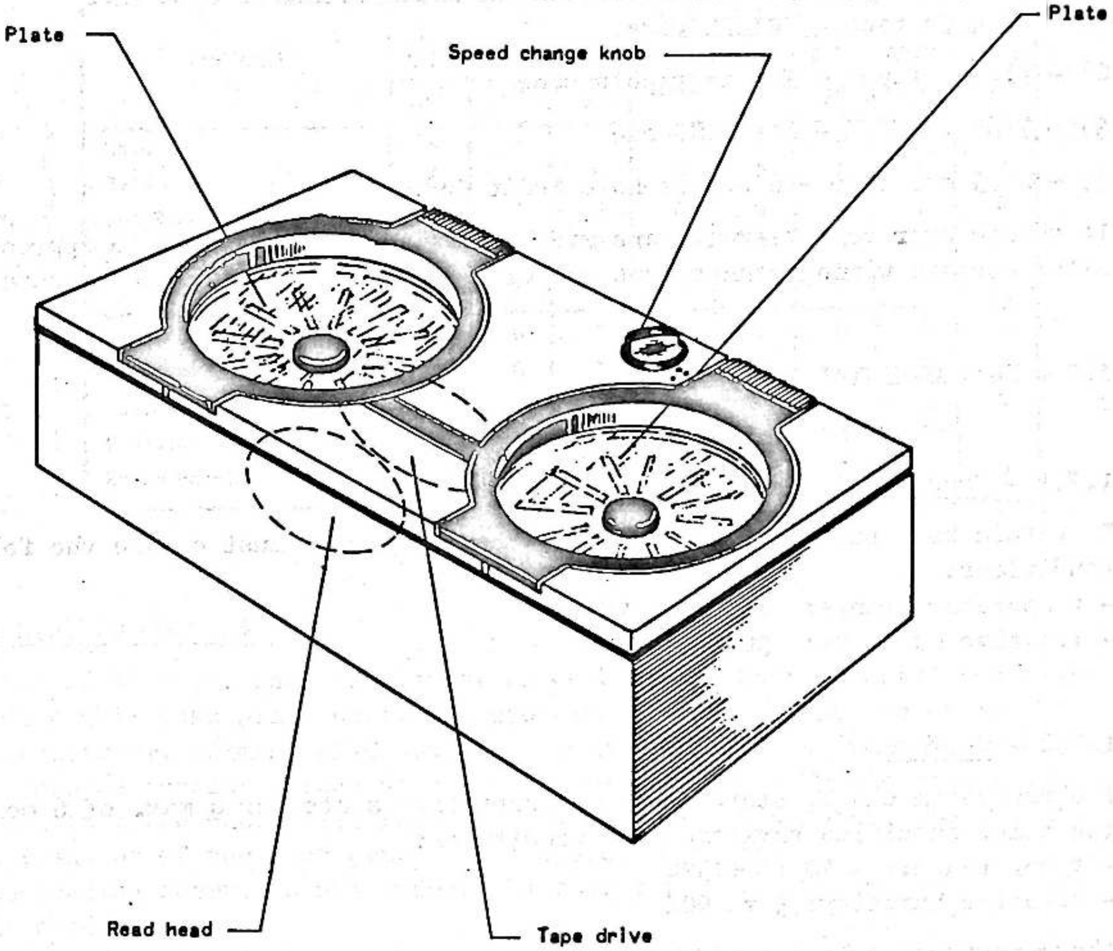


Fig. 1.9 - Mechanics Assembly

1.6 - OPTIONS

There are two basic versions of this subsystem, one having a 50 Hz and the other a 60 Hz supply voltage.
Both versions can use the following media:

1) - 1" wide tape - ISO 7 code
     1" wide tape - ISO 6 code
     1" wide tape - IBM code
     1" wide tape - FRIDEN code

2) - 11/16" tape - 5 telegraphic code

3) - 7/8" tape - 6+1 TTS code

4) - 20.5 mm. tape - 6 square hole Audit Code.

To change over to different tape widths, it will be necessary to appropriately alter certain wiring connections and either reset or replace the mechanics.

1.7 - ENVIRONMENTAL CONDITIONS

1.7.1 - Functional

To obtain best subsystem performances the site rooms must ensure the following conditions:
- temperature range: 15°C to 35°C
- relative humidity: 30 to 70%

1.7.2 - Storage

The subsystem can be stored in a non operative state for a max. of 6 months at the below specified environmental conditions:
- temp. range: - 30 to +75°C
- relative humidity: 5 to 90%

There must be no traces of water condensation on the unit.
It is advisable to let the subsystem lay in the site room environment for at least 24 hrs before switch-on.

2. PROGRAMMING CHARACTERISTICS

2.1 - COMMANDS DESCRIPTION

The commands that the subsystem receives from the processor are:

	COMMANDS	CODE INFO							
		LIFU	CIFU	FIFU	EIFU	DIFU	CIFU	BIFU	AIFU
		2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
PTR 100	Read Fwd.	0	1	0	0	0	0	0	0
	Read Rev.	0	1	0	0	0	0	0	1
	Set Rev. Read	1	0	1	0	0	0	0	0
	Rewind	0	1	0	0	0	1	0	0
	Operator Call	1	0	1	0	1	1	0	0
PTR 101	Read Fwd.	0	0	1	0	0	0	0	0
	Read Rev.	0	0	1	0	0	0	0	1
	Rewind	0	0	1	0	0	1	0	0
	Operator Call	0	1	0	0	1	1	0	0
	Error Reset	0	0	1	0	0	1	1	1

2.1.1 - Read (01000000)

Upon issue of this command the controller enables the unit to drive the tape and reading will take place until the processor forwards FINE. So as not to lose a character, command FINE must be issued within 800us from the last processor accepted character read strobe. This in order to stop the tape in such a position that the photocells result in the "no light" condition to enable correct read-out of the next processor accepted character.
When the reading operation has ended, the controller remains set in the " Read Forward" condition.
The "Read Fwd" command unwinds the paper tape from the right hand plate rewinding it onto the left plate.

2.1.2 - Read Reverse

When such a command is received, both the "Set Rev. Read Mode" and "Read" flip-flops will set and operations will therefore take place as described in para. 2.1.1.
When reading finishes, the controller remains set in the "Read Forward" condition.

2.1.3 - Set Reverse Reading

When this command is issued, it sets the appropriate Set Mode FF so as the next read command will in effect interpret a read reverse operation.
The set Mode flip flop will always be set to the "Read Fwd" mode after either a Read Fwd or Read Rev command.
This command does not hold the controller busy.

2.1.4 - Rewind

This command reverses tape drive, taking up the media on the right plate until end of tape.

2.1.5 - Operator Call

Such a command throws the unit to the Manual mode, a condition that will be visualized on the operator panel when the Operate lamp goes out, consequently holding the unit busy.
Unless Out of Service conditions exist, to reset the command the operator must depress Operate.

2.1.6 - Error Reset

This command, only valid for the PTR 101, determines the reset of FF Error.

2.2 - STATUS INFORMATION

The following subsystem states may be checked from the processor:

1) - PTR 100

- Controller Available	PE00	(0/1)
- Controller Error	EGOL	(0/B)
- Out of Service (Alert)	MARE	(1/4)
- End of Tape	TESE	(1/2)
- Mechanical Unit On	MATE	(1/A)
- Interruption	IGOL	(2/2)
- Operator Panel Signal	SECO	(2/E)

2) - PTR 101

This PTR also has the Error Signal SEGE (0/3) status info.

2.3 - TIME FEATURES

To enable read-out of all the characters present on the tape, the end of transmission command, and therefore halting of the tape drive, must be issued within a brief interval from the last character read strobe. Refer to par.2.1.1.
The time within which the processor must fetch-in the character from the controller must therefore be limited as much as possible and depends on which processor is tied-up to the controller.
However, this time must be such as to enable issue of FINE (tape halt) within 800 us. from the character strobe.
Should this not be the case, the tape will stop on the next cgaracter and, if the processor is unable to accept a character after the end of transmission,that character will be lost.
After the read operation (tape halt), the controller remains busy for 40ms, giving time enough for the mechanics to be reset on the correct conditions.

3. MAINTENANCE AND OPERATIVE CHARACTERISTICS

3.1 - OPERATOR PANEL

The operator's panel houses 5 monostable pushbuttons and a 3 position selector switch.
The pushbuttons are:

- OFF : Removes machine power
- ON/STOP : Powers-up the machine, allowing manual control. Tape drive is halted should this pushbutton be depressed while the machine is running and tape is moving.
- OPERATE : The machine is commanded by the processor. Depressing this pushbutton will reset the controller's FF MARE.
- → : Drives tape from left to right
- ← : Drives tape from right to left.

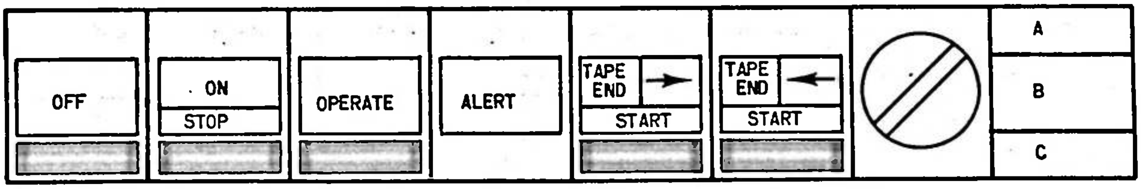


Fig.3.1 - Operator Panel

The 3 pos. selector switch allows reading of different types of tape as follows:

- PTR 101
  - Position A = Audit tape - stops on CL code
  - Position B = /
  - Position C = Program tapes - stops on CZ code
- PTR 100
  - Position A = ISO tape - 7+1 channels and TTS
  - Position B = IBM or FRIDEN tapes
  - Position C = Other tapes (ISO - 6+1 channels; Telegraphic tape).

The out-of-service ALERT indicator lights whenever MARE results at logic level 1.

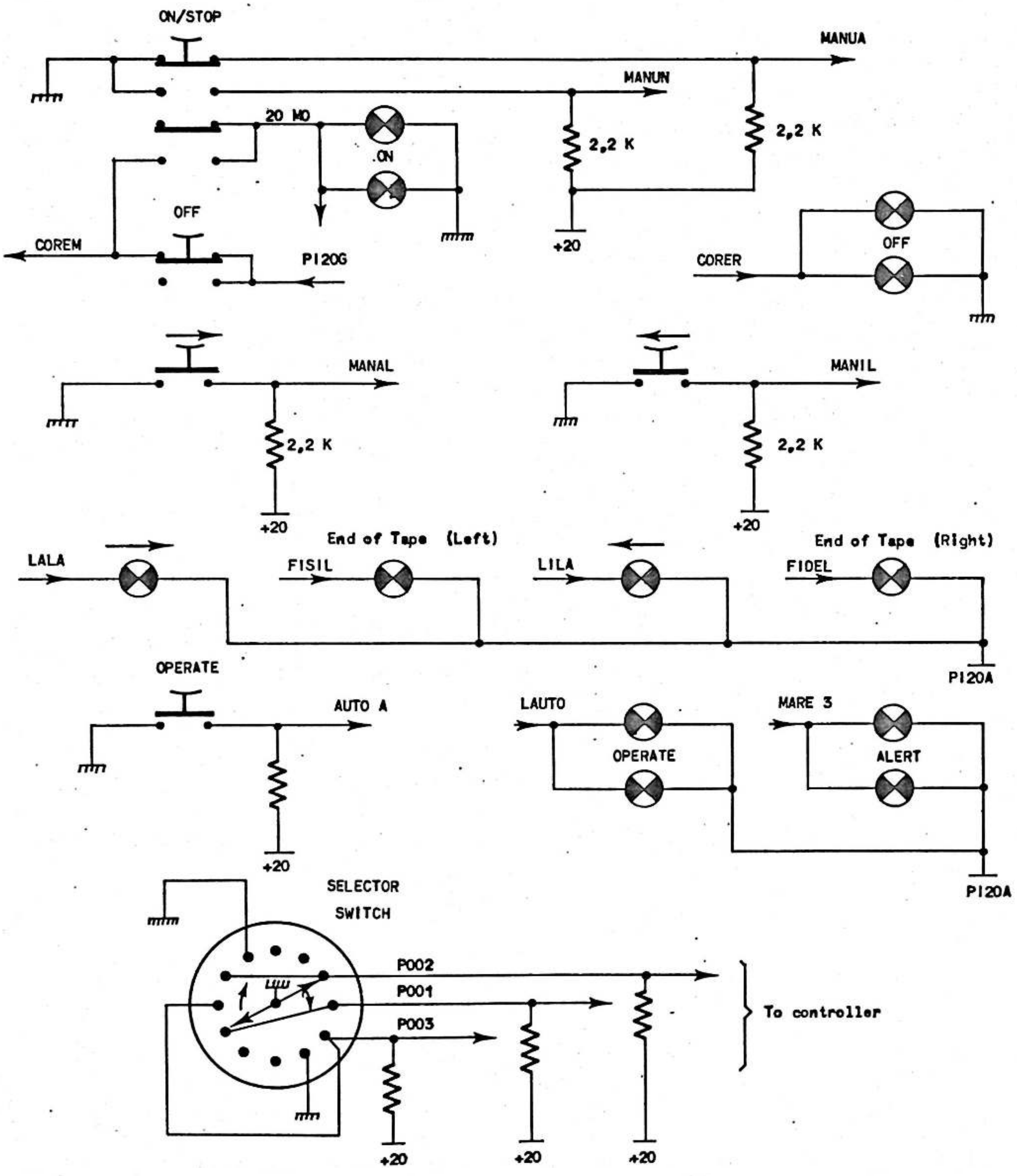


Fig. 3.2 – Operator Panel Electrical Layout

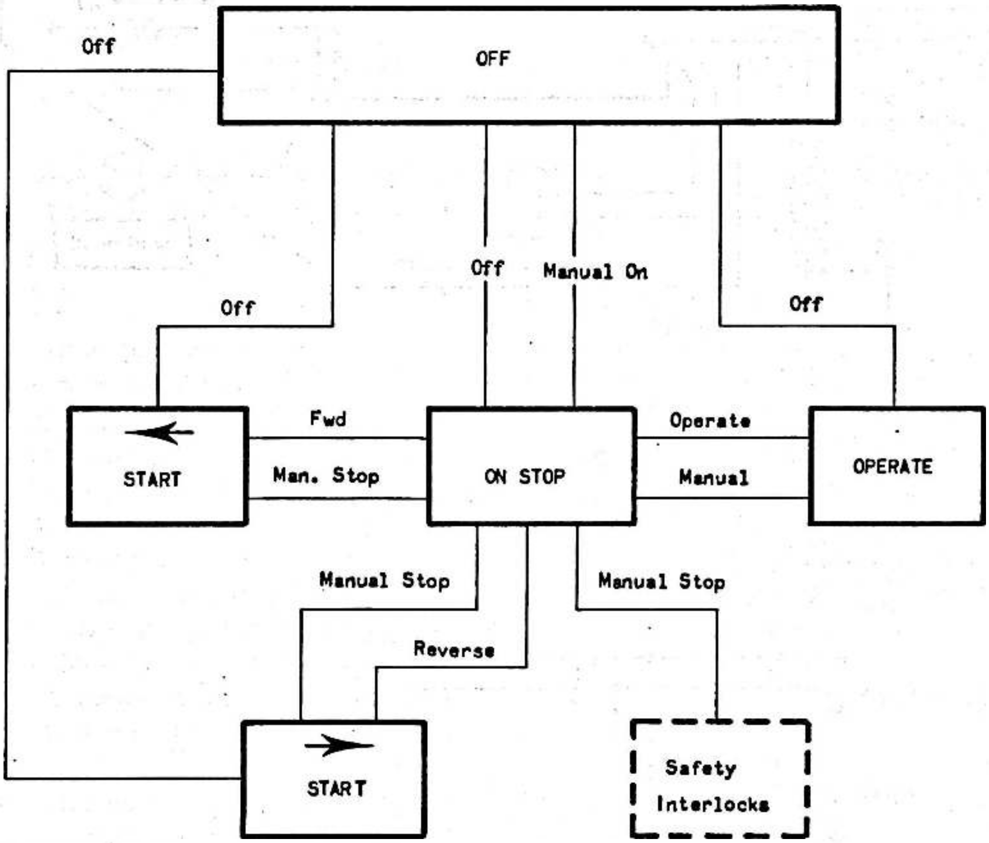


Fig. 3.3 - Logic Operation Sequence

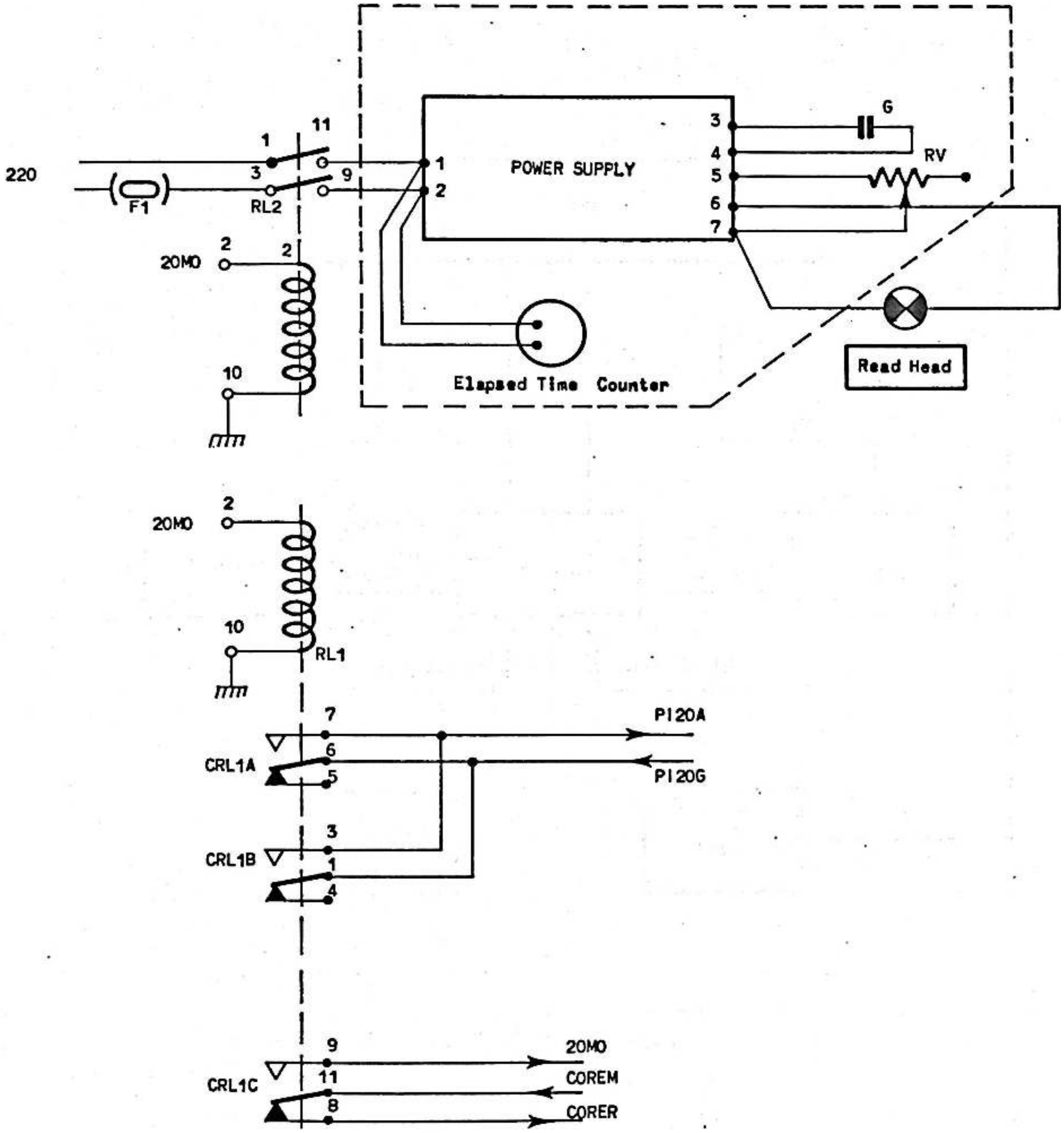


Fig. 3.4 - Power Supply Command Circuit

3.2 - OPERATING INSTRUCTIONS

The operator panel may be split-up into 3 sections :

- Status pushbuttons (with associated lamps) : OFF-ON/STOP-OPERATE
- Indicators : ALERT
- Operation pushbuttons (with associated lamps) : START-Fwd and START-Rev.

3.2.1 - Status Pushbuttons

1) - OFF

Turns off power from the machine. Its associated indicator lamp will light with the +20 V CORER signal, generated by the CRL1C n.c. contact and, naturally, when its pushbutton is depressed.

2) - ON/STOP

When this pushbutton is depressed, power is applied to the machine and its indicator lamp will light.
Switching of the ON/STOP contacts supplies + 20 V (20 MO) to RL1.
The working contacts of RL1 are CRL1A, CRL1B and CRL1C.
Contacts CRL1A and CRL1B supply +20 V from the controller (PI 20G) to all the D.O.E. (PI 20 A).
CRL1C removes the +20 supply (CORER) from the OFF lamp and brings a steady 20 V (COREM) to 20 MO even after release of the ON/STOP pushbutton.
Energizing of RL2 supplies 220 V to be subsystem motor and to the lamp Power Supply (saturated core type Supply).
Manual control is obtained by depressing ON/STOP which causes MANU to switch from "0" to "1".
MANU in fact sets the controller's MAIN FF therefore generating MACON which, from the controller, is issued to the D.O.E.
This signal sets MACO to "1" and MACOB to "0".
MACO at "1" holds VITO and VATO at "0" (refer to fig. 3.5) consequently inhibiting controller commands COAVA and INDIN.
Under this condition a Manual command may be carried out (CEVI and CEVA - see fig. 3.5).
MANUA, going to "1", causes the STOP condition; refer to fig. 3.5.
Under such a condition ALTEA goes low and REIN goes high, again see fig. 3.5.
REIN resets flip flops VIMA and VAMA preventing setting of a Start command.

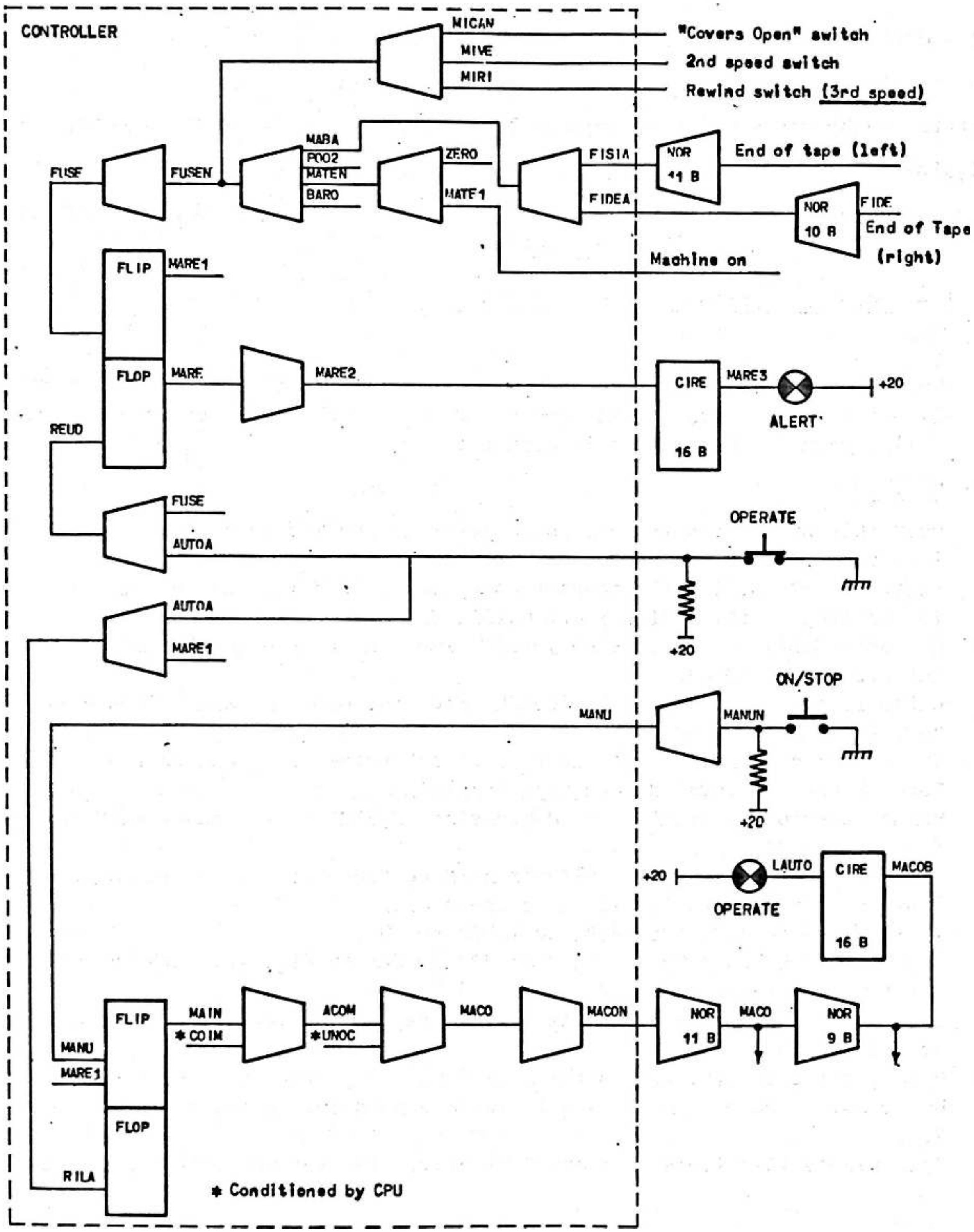


Fig. 3.5 - "MANUAL (On/Stop) - OPERATE" Logic Conditions

3) - OPERATE

When Operate is depressed, signal AUTOA goes low.
AUTOA, issued to the controller, NORed with FUSE (Alert) resets FF MARE , cancelling the Alert condition.
Resetting of MARE is conditioned by FUSE at "0", that is to say by the operating state of the machine.
In fact FUSE will be at "0" if MICAN, MIVE, MIRI and P002 (in case of PTR 101) are low and if MATE 1, FISIA and FIDEA are high.
These conditions will arise if :

- the covers are closed (MICAN)
- the machine is neither set to the 2nd or rewind speed (MIVE and MIRI)
- the 3 pos. switch is not on P002 (PTR 101)
- power on (MATE1)
- not at End of Tape (FISIA and FIDEA)

Should all these conditions be met therefore, MARE1 will be at "0".

MARE 1 NORed with AUTOA throws RILA high which in turn resets FF MAIN.
Through a series of 3 NOR gates, MAIN low gives way to MACON at "1".
Issued to the controller, this signal sets MOCO low and MACOB high.
MACO at "0" enables VITO or VATO to go high through a Start command from the processor (COAVA or INDIN).
MACOB at "1" holds CEVA and CEVI low so as to prevent manual control signals from interfering on the D.O.E. logic chain.
MACOB also gives way to REIN at "1" which resets flip flops VIMA and VAMA bringing their set output to "0".
Under these conditions, the actuators can only be commanded via signals VITO and VATO produced by the Operate condition.
The event is monitored on the operator panel through MACON signal controlled circuit CIRE (LAUTO).

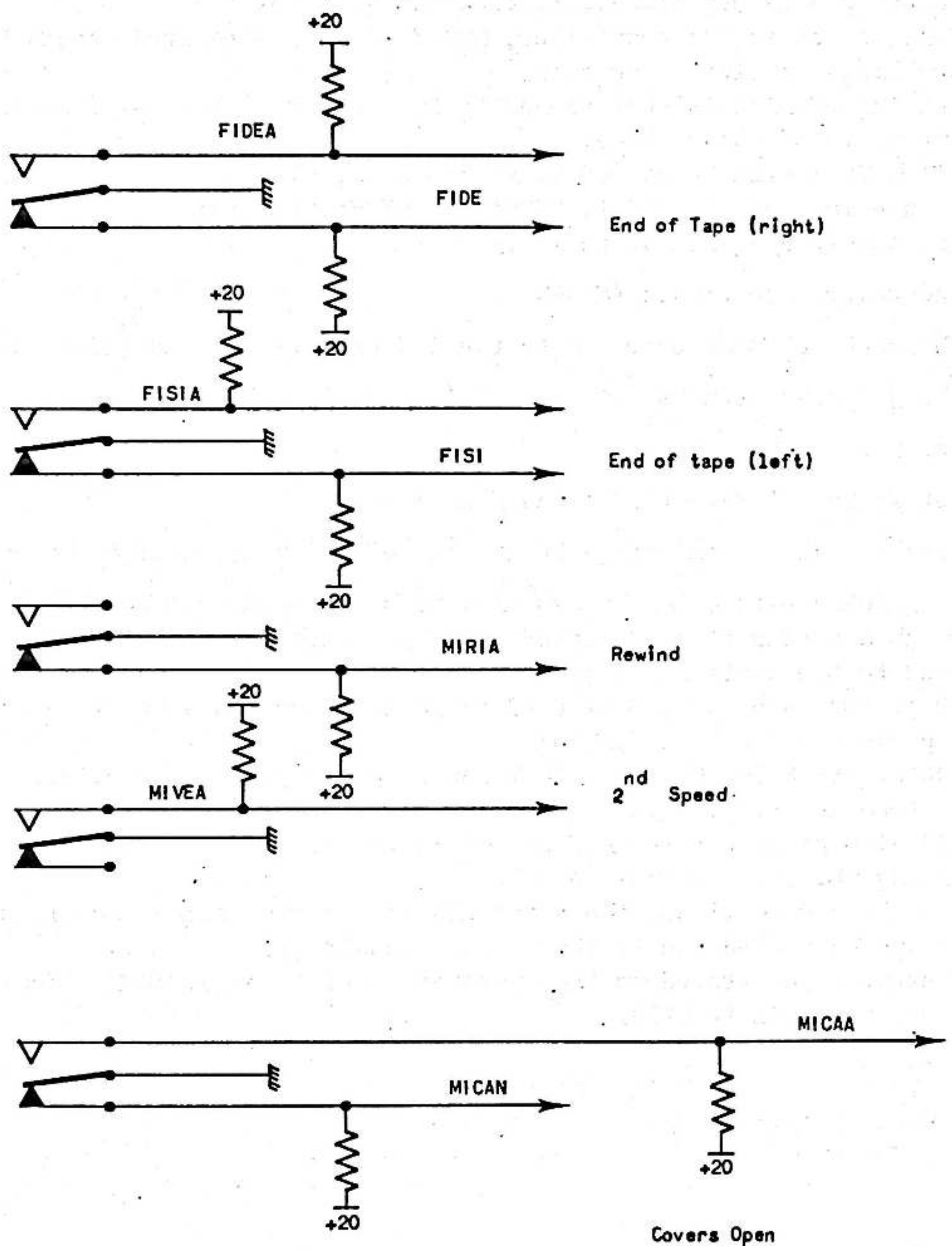


Fig. 3.6 – Switches Layout

3.2.2 - Indicators

1) - Stop for "Covers Open" Condition (ALERT)

Raising the covers transfers the appropriate safety interlock throwing MICAA to "0" and MICAN to "1".
MICAN at "1" puts ALTEA low and REIN high.
REIN resets flip flop VIMA and VAMA ending all Start functions should the machine be set to the Manual control condition.
MICAN also holds VITO and VATO at "0" so as to avoid effectiveness of Automatic Start functions (Operate) on the actuators.
MICAN holds BATA to "0" preventing energizing of the Stop solenoid.
The Alert indicator (Out of Service condition) will light up.

2) - Stop for End of Tape Condition

The End of Tape condition, during a forward run, is sensed by the switch located on the left. This switch, when transferred, throws FISI high and FISIA low. FISI resets VAMA which de-energizes the Fwd. actuator and energizes the Stop solenoid.
The appropriate " → Tape End" indicator therefore lights up.
The end of Tape condition during a reverse run is, on the other hand, sensed by the switch located on the right.
Transfer of this switch resets FF VIMA and stops tape drive through FIDE at "1", consequently turning on the " ← Tape End" display lamp.

3.2.3 - Operation Pushbuttons

1) - START ← (Forward)

When this pushbutton is depressed, signal MANAL is thrown low. With VIMA and MACOB both at "0", MANAL at "0" gives way to signal CEVA at "1".

- VIMA is low if the machine is not operating in Rev. mode.
- MACOB is low when the machine is not in the Operate condition.

CEVA at "1" sets FF VAMA which remains set for the entire period of the Fwd. command. When the pushbutton is released, CEVA, going to "0", does not therefore alter the condition of FF VAMA.
NORed with VATO (only at "1" when in Operate condition), signal VAMA at "1" throws LEAV low and LEAV 1 high.
This last signal fires the Fwd. solenoid command circuit, consequently energizing the solenoid. Since MANIL will go to "0" should the Reverse pushbutton be accidentally depressed, it is NORed with VAMA and MACOB to hold CEVI low and prevent FF VIMA from setting.
VAMA, holding CEVI at "0", therefore inhinits firing of the Rev. D.O.E. logic chain during a Fwd. command.
The appropriate section of the indicator will consequently turn-on through LEAV1 which supplies circuit CIRE (LALA).

2) - START → (Reverse)

When this pushbutton is depressed, signal MANIL goes to "0".
With VAMA and MACOB both at "0", MANIL at "0" gives way to signal CEVI at "1".

- VAMA is low if the machine is not operating in Fwd mode.
- MACOB is low if the machine is not in the Operate condition.

CIVA at "1" sets FF VIMA which remains set for the entire period of the Rev command. When the pushbutton is released, CIVA going to "0" does not therefore alter the condition of FF VIMA.
NORed with VITO (only high when in Operate Condition), signal VIMA at "1" throws LEIN low and LEIN 1 high.
This last signal fires the Rev. solenoid command circuit consequently energizing the solenoid.
Since MANAL will go to "0" should the Forward pushbutton be accidentally depressed, it is NORed with VIMA and MACOB to hold CEVA low and prevent FF VAMA from setting.
VIMA, holding CEVA at "0", therefore inhibits firing of the Fwd. D.O.E. logic chain during a Rev. command.
The appropriate section of the indicator will consequently turn-on through LEIN 1 which Supplies circuit CIRE (LILA).

3) - Depressure of ON/STOP when in OPERATE and Tape Drive is Under-Way.

Should the ON/STOP pushbutton be depressed, under the conditions described in the title above, MANUN switches from "1" to "0" and MANUA switches to "1".
MANUN at "0" sets MANU high which, forwarded to the controller, will set FF MAIN.
Flip-flop MAIN, by setting, inhibits the controller from forwarding commands to the PTR and, via MACON at "0", turns out the Operate display lamp (MACOB at "0").
MANUA at "1" sets ALTEN to "0" and REIN to "1".
Under this condition REIN resets flip-flops VIMA and VAMA.
With both these two flip-flops low, plus VITO and VATO low (held so by MACO at "1"), the previously actuated solenoid is de-energized and, through BATA, the stop solenoid energizing power circuit is enabled to stop tape drive.

4) - Depressure of ON/STOP when in Manual Mode.

When this pushbutton is depressed while manual tape drive operations take place, it immediately halts the tape.
MANUN in fact goes to "0" and MANUA to "1".
MANUN has no function since FF MAIN (in the controller) results set during manual operations.
MANUA at "1" puts ALTE to "0" and REIN to "1". This latter signal is fed to the reset inputs of flip-flops VAMA and VIMA, resetting the one previously set by the Start command. When both VAMA + VIMA and VITO + VATO (held at "0" by MACO at "1") are at "0", the previously energized actuator is de-energized and, through BATA, the stop solenoid command circuit is enabled to stop tape drive.

3.2.4 - Speed Change

If an attempt should be made to change tape drive speed while the machine is in the Operate condition, the tape will stop and the machine transferred to the Alert status.
MIRIA (Rewind) at "1" or MIVEA (2nd speed) at "0" forwarded to the controller, through FUSE, will set FF MARE. Refer to fig. 3.5.
MARE1 sets FF MAIN which causes MACON to go low.
This signal, issued to the D.O.E., sets MACO high clamping signals VITO and VATO to "0" consequently inhibiting automatic commands COAVA and INDIN.
With both VITO + VATO at "0", the previously energized Start solenoid deenergizes and the Stop solenoid is activated to halt tape drive.
When the machine is set to Manual mode operation, speed changes may be effected without call-in of the safety interlocks.

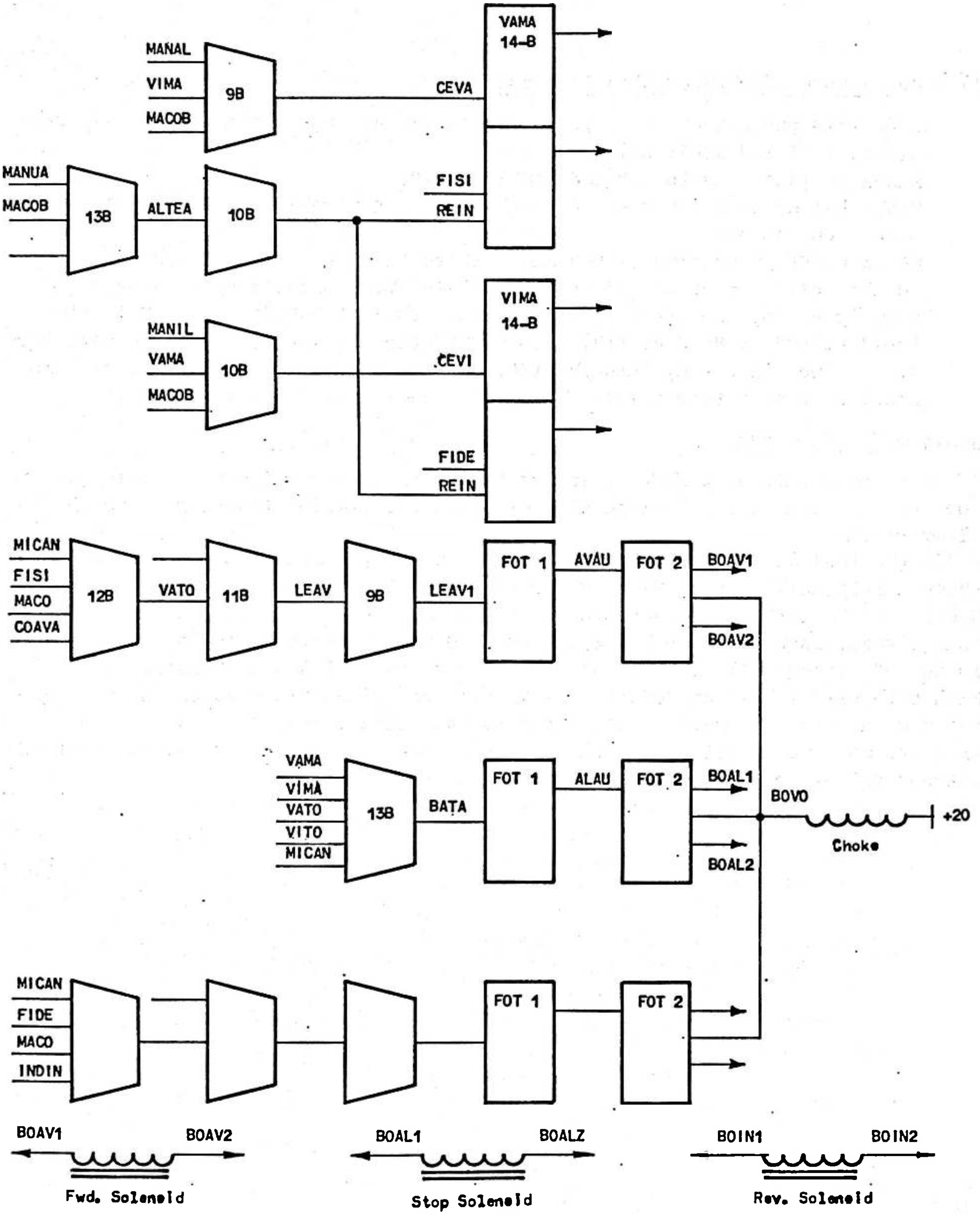


Fig. 3.7 - Logic Diagram

3.3 - ROUTINE OPERATIONS

3.3.1 - Tape Insertion

Raise the tape pressure plate and load the tape roll on the right hand plate in such a way that, when it unwinds, it rotates clockwise.
Insert the tape in the read track, wind-up 3 turns on the left plate and therefore close the covers.

3.3.2 - Inter-Character Gap Check.

The subsystem is provided with a template, physically illustrated in fig.3.8 , to easily check the punch pitch.

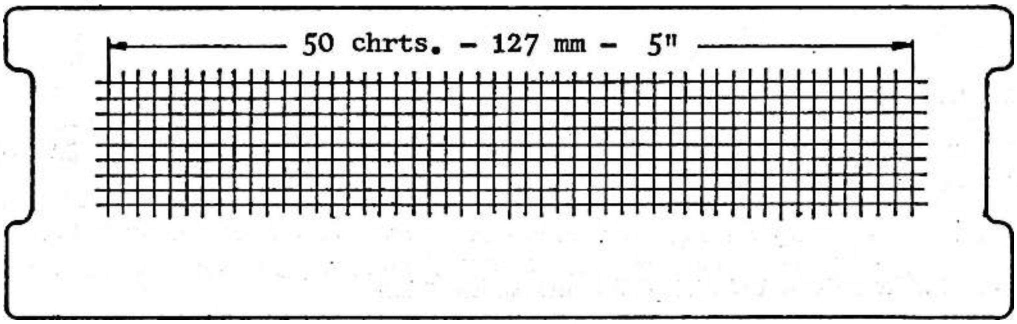


Fig. 3.8. - Template

Tapes may be considered feasible when a tolerance of ± ½ hole (± 0.9 mm) is not exceeded on a length of tape having 50 characters punched on it.

3.4 - ALARM CONDITIONS

- No annotation.

3.5 - RESTORING PROCEDURES

Should the tape get torn in the read track, to restore normal machine operations, follow the hereby given procedure:

- Depress STOP.
- Ascertain that the track results free of unwanted particles or paper chads.
- Replace the tape in the reader as described in par. 3.3.1.

3.6 - EMERGENCY PROCEDURES

- No Annotation.

3.7 - HANDLING OF THE MEDIA

The tapes must be held stored in the site enevironment for at least 24 hours before actual use.

3.8 - MAINTENANCE PANEL DESCRIPTION and OPERATION

3.8.1 - Controls an Indicators

- No annotation

3.8.2 - Test Details

- No annotation.

3.9 - FAULT DIAGNOSIS

- No annotation.

4. OPERATION THEORY

4.1 - GENERAL BLOCK DIAGRAM DESCRIPTION

- No annotation.

4.2 - INTERMEDIATE BLOCK DIAGRAM DESCRIPTION

- No annotation.

4.3 - DETAILED DESCRIPTION

4.3.1 - Logic Description

4.3.1.1 - PTR 101 Controller (GIB 410) Logic Description

1) - Machine Commands

With any CPU issued command the controller, via the TISO-TISON-RIRI and TE301 chain, answers with a "Received" TE30.
Signal TICON, that enables command decodes, will be generated in case the command is not an End command (FINU 1) and the unit results available (UNOC).
The commands utilized by the PTR 101 (square holes) are:

- 2/0 - Read Fwd. (tape is driven forward with a read check)
- 2/1 - Read Rev. (tape is driven in reverse without a read check)
- 2/4 - Rewind (take-up operation ends when no more tape is to be rewound).
- 2/7 - Error Reset (clears possible error signal).
- 4/C - Operator Call (holds controller busy, turns-off Operate lamp, signalling to the operator that the machine is in Manual condition.

The read Forward and Read Reverse commands are stored in flip-flops COAV and COIN which are reset by Alert or Clear (REMA) and by End signal MAFI.
Flip-flop RINO in turn stores the rewind command.
This flip-flop resets with Alert or Clear (RENA) and with the End of Tape condition FIDE 1.
Read Fwd. signal COAV generates COAVA that, issued to the D.O.E., drives the tape forward.
Signals COIN and RINO give way to INDIN that, forwarded to the D.O.E., imparts reverse drive to the tape.

The manual intervention command is stored in FF COIM that is reset if no Alert Condition is present (MARE 1) and if Operate is depressed (AUTOA).
When the manual operation pushbutton is depressed (MANU) or should there be an Alert condition (MARE 1), flip-flop MAIN sets and generates SECO.
This signal is utilized by the CPU that forwards the manual intervention command.
Should the unit result available, ORed signals MAIN and COIM generate MACON that enables the reverse drive pushbutton and turns-off the Operate indicator lamp.
Flip-flop MAIN resets in the same way as FF COIM.

2 - Condition Signals

a) - Controller Available

This condition signal (PE00) is generated by signal COUD that results low whenever either a read or rewind (UNOC at "1") operation is under way or a manual intervention (COIM at "1") has to be implemented.
Flip-flop UNOC sets when a read or rewind command (COVIN at "0") is received while it resets after 5 ms from the end of one of these commands (COVI goes low).
An Alert condition or a general reset (REMA at "1") would also cause UNOC to reset.

b) - Alert (Out of Service)

Any of the hereby listed conditions will set FF MARE 1 that, after due clear-up of the malfunction (FUSE), can be reset by depressing Operate (AUTOA).
Conditions that will give rise to an Alert signal are:

- No tape on either of the handlers. Both End of Tape switches are closed (FIDEA + FISIA).
- PTR in off (MATE 1).
- The read data- read program selector switch is set to pos.2, that has no meaning for the square hole controller (P002).
- Torn Tape (BARO).
  Caused when all the photocells result hit by light.
  Tapes must therefore never have two FINE (End)characters near each other .
- Cover open (MICA1).
- Speed switch set to 200 chrts/sec (MIVE)
- Speed switch on 800 chrts/sec (MIRI).
  This speed is used when rewinding with machine set to Manual Mode.

c) - End of Tape and Machine - On

End of tape signal TESE arises with the ORed condition of the right and left end of tape signals FIDEA and FISIA.
The machine under power signal, MATE, is issued by the D.O.E. (MATE 1) providing that the pertinent ON pushbutton has been depressed.

d) - End Signal

The PTR can read both data tapes (End code corresponds to perforations A-B-C) and program tapes (End code corresponds to all perforations) by appropriately setting the operator panel's selector switch.
When set to pos. A (signal P001 at "0") Audit tapes may be read, while if set to pos. C program tapes can be processed.
Signal FINE, forwarded to the CPU, corresponds to signal FIDEN.
For Safety reasons, with the tape in forward drive (COAV 1 low) there will be a double End signal; one given by the check head (TUTA for read program and CILA for read data) and the other by the read head (TUTE for read program, and CILA for read data).
Seeing as though check head End signals TUTA and CILA go low with issue of TE20, they are stored by FF FICO.
When in Rev. Read, only the End signal from the read head will be sensed (COAV 1 at "1").
Reverse reading is only used as a repositioning operation; that is to say, in order to reposition the tape back 1 block, a 2 blocks reverse read must procede a 1 block forward read operation.
Figure 4.1 recalls the position of the head, before the reposition with an a; after the 2 blocks reverse read-out with a b and after the successive 1 block forward read with a c.
Signal FINEN also goes to "0" when the End of Tape switch closes (FISI 1) so as to enable the processor to fall out of sequence should the End character not be punched on the tape. FINEN enables the trigger input of one-shot FIRI and FF COUG.
Upon issue of the End character's (TE20C) strobe TE 20, the one-shot will fire and the FF will set.
Should signal CONU (Repeat Command), that resets COUG, not be issued within the time established by one-shot FIRI, the read fwd and read rev. flip-flop will be reset by one-shot MAFI, halting tape drive.

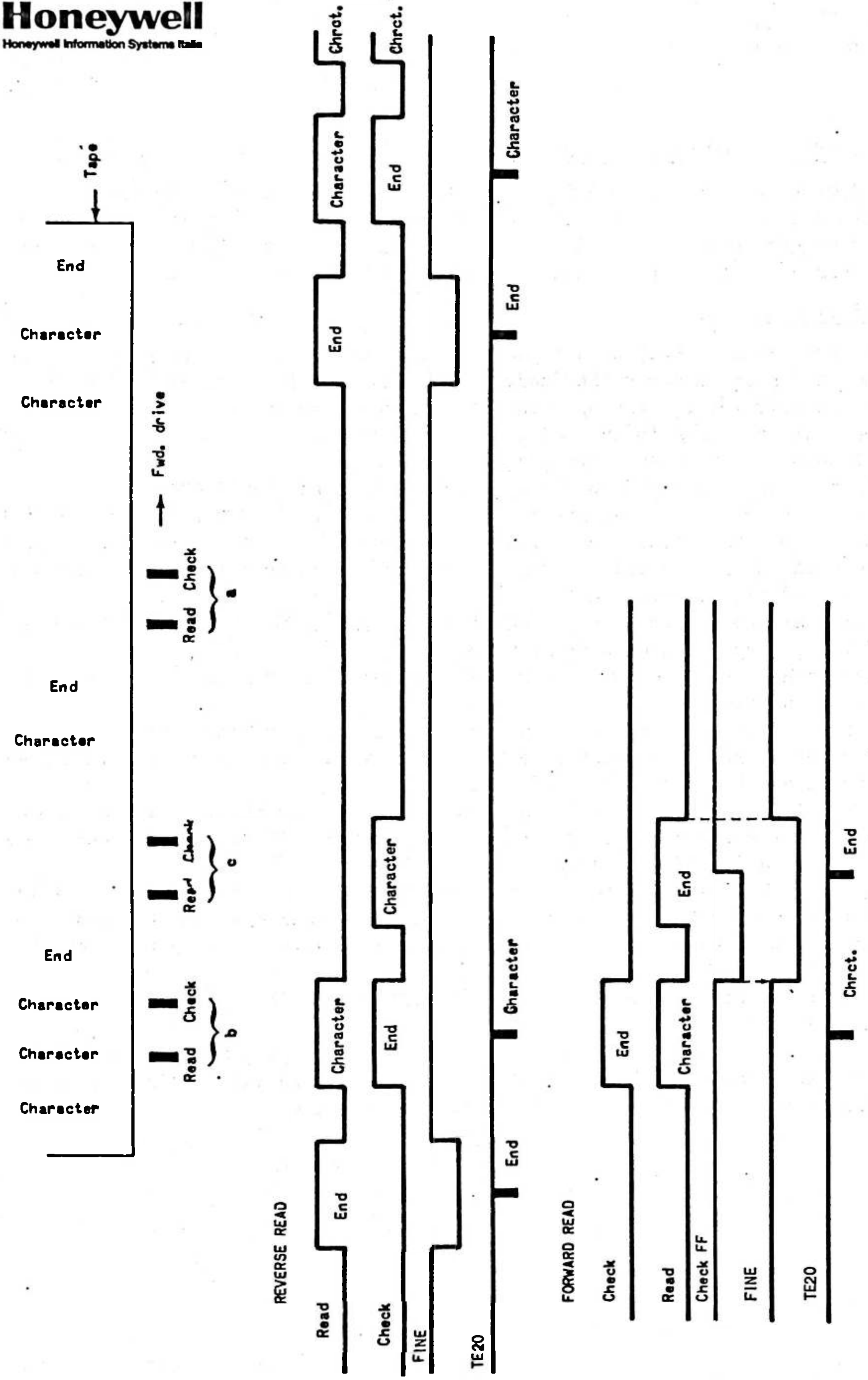
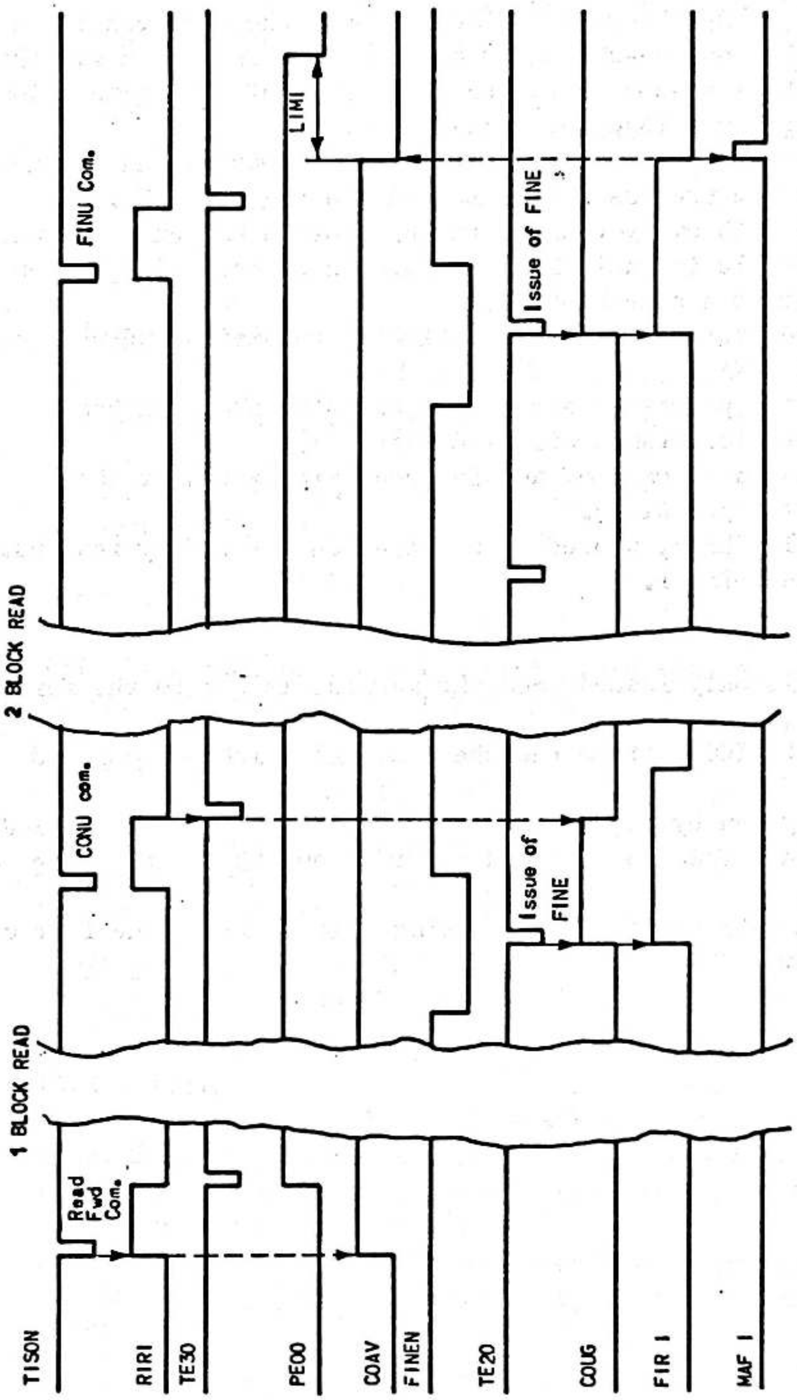


Fig. 4.1 - Read Signals



N.B. - There is no proportion between duration of the various signals.

Fig. 4.2 - 2 Blocks Read-Out

e) - TE 20 Generation.

When in the Read Fwd. or Read Rev. mode (AVINN low), the ORed condition of the tracks will fire 800 us one-shot RISO and 2us MALE in such a way that MALE's trailing edge will result approx to the centre of the perforation.
Issue of TE20 is again conditioned by signal COUG.
This signal will be at "1" if the last character read was an End character (FINEN low) or should the processor have issued End signal FINUA.
Flip-flop COUG resets with every command (except for an End one) and when the unit results available (signal TICO) or through command CONU, intended as level wire CONUN or as decode RIDE.
The controller does not foresee the read on length condition and a successive issue of command CONA.
Signals forwarded to the processor are those issued by the read head (appropriately inverted for standardization reasons).
TE 20 must also be issued in case of and End condition given by the transfer of the End of Tape switch.
The end of tape signal (TEFI), stored in a flip-flop for safety reasons, fires one-shot RISO-MALE-TE201.

f) - Error Signal

This signal (SEGE 1) is only issued when the machine is set to the forward tape drive condition (RICO 1 generation).
Six flip-flops (ICOA to ICOF) store the check signal which is compared to the read signal.
Possible difference, given by the comparison, enables setting of the SEGE 1 error FF that is in turn reset by command instruction REGE or clearing of Alert condition REMA.
Only referring to a single track, the following page outlines the four cases of possible reading.

	1st	2nd	3rd	4th
Check head read	1	0	1	0
Read head read	1	0	0	1
	$\overline{\text{Error}}$		Error	

0=No punching
1= Punch

- 1st Case : Check 1
  Read 1

Flip-flop ICOA sets with transfer of the light-no light condition on check head ACOAN.
This FF resets when the CPU receives the read character because ISOA is generated (ALEA low).

- 2nd Case : Check 0
  Read 0

Flip-flop ICOA will not be set because both the trailing edge of ACOAN and signal ISOA are missing (ALEAN high).

- 3rd Case : Check 1
  Read 0

ICOA sets because ACOAN's trailing edge is present but reset signal ISOA is missing (ALEAN high).
The FF remains set.

- 4th Case : Check 0
  Read 1

Although ACOAN's trailing edge is missing, FF ICOA is set by signal ISOA (ALEAN low).
Should the FF result high, SEGE's trigger input is enabled.
After 20 us from issue of TE20, signal RICO 1 is issued.
This signal's trailing edge will set the error FF and reset that check FF that gave way to the error signal.
The check flip-flops are also reset with every command (except the End command) when the unit is available TICO 1 and with a general reset of Alert (REMA).

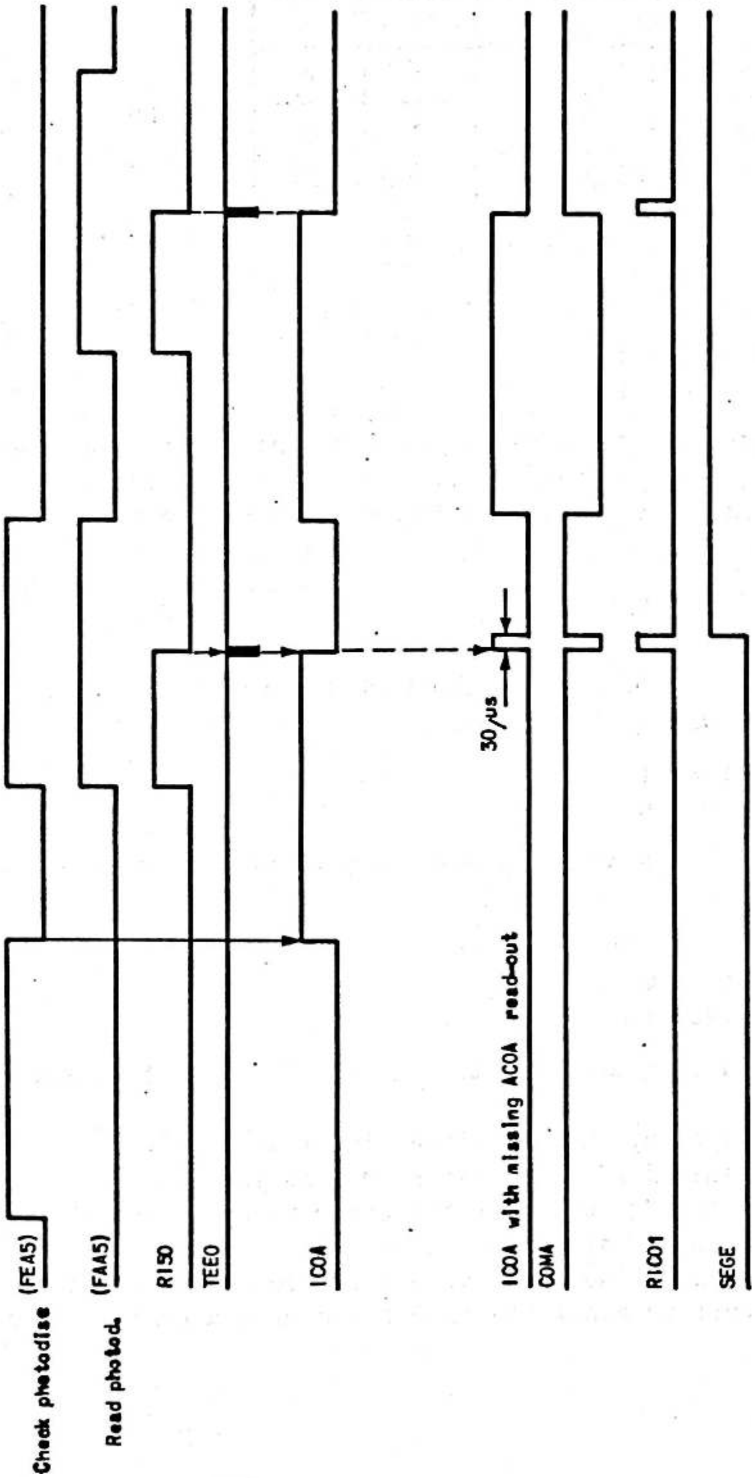


Fig. 4.3 - Timings

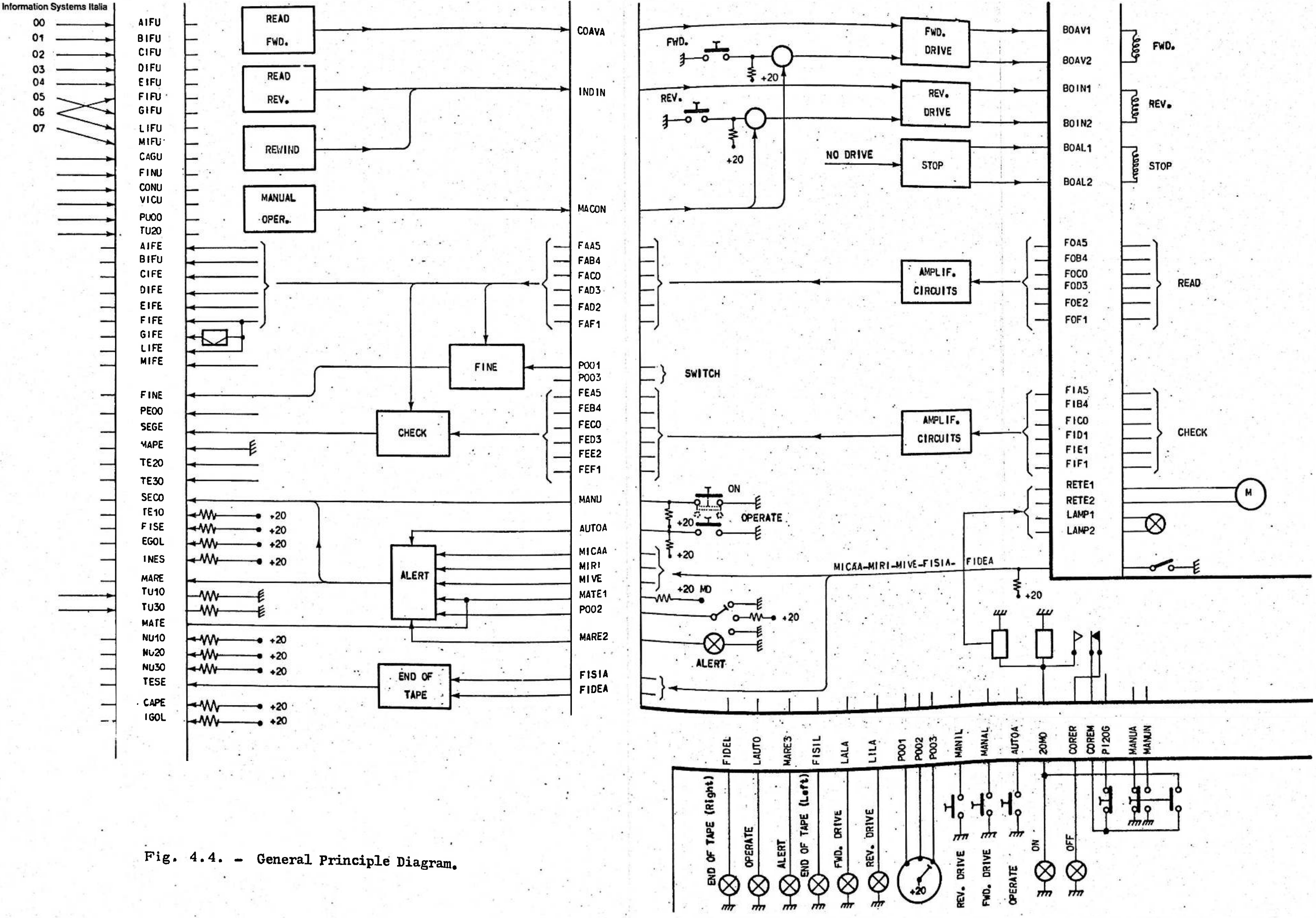


Fig. 4.4. - General Principle Diagram.

4.3.1.2 - PTR 100 Controller (GIB 420) Logic Description

1) - Machine Commands

The commands accepted by the PTR 100 (round holes) are:

. 4/0 - Read Fwd. (tape is driven forward).

Continuons reading is performed, in forward direction, until the CPU issues stop command signal FINU.
To read the next character FINU must be issued while the read photocells are still hit by the light of the last character. FINU must therefore be generated within 250 us from the last character read.
At the end of the read, the controller remains set to read forward.
Should the command foresee drive intervention therefore, the 1st character will be lost.

. 4/1 - Read Rev (tape is driven backward)

Upon issue of this command, the Set Mode FF (MODO) sets. This FF with FF MOTO enables the read reverse condition. The FINU (CPU End) logic is equivalent to that described for the Read Fwd. mode.

. A/0 - Set Rev. Read

As soon as this command is generated, FF MODO sets.
All subsequent read-outs therefore result in the reverse read mode.
The command does not hold the controller busy.

. 4/4 - Rewind

Tape will be taken-up completely and rewinding stops with issue of FISIA.

. A/C - Operator Call

This command switches the machine to Manual Mode, setting FF COIM, and gives way to the Unit Busy display.
To reset this command, and always provided that no Alert condition is present, merely depress Operate.

2) - Condition Signals

a) - Controller Available

This unit will result available under the following conditions:

. after Clear from CPU (general reset)

. Upon end of a read or rewind operation (reset of UNOC via LIMA)

. when Operate is depressed if no Alert conditions are present (signal RILA in COIM flip-flop reset input).

. Should an Out-of-Service (Alert) condition arise when the unit is busy on a tape movement command. (Signal REMA resets MOTO which in turn, after the 40 ms limit time, resets UNOC).

b) - Alert

This condition will arise should:

- the PTR be off (MATE 1)
- the covers be open (MICA 1)
- the speed switch be set to pos. A (250 chrts/sec. - MIVE)
- the speed switch be set to pos. C (775 chrts/sec. - MIRI)
- the tape be torn (BARO).
  This signal comes from the sync track.
  When tape breaks, one-shot BARO de-energizes to set MARE.
- no tape be present (MABA).
  Obtained when both the right and left End of Tape signals FIDE and FISI arise.

c) - End of Tape - Manual Mode - Machine On

The end of tape signal TESE is generated by the ORed condition of FIDEA and FISIA.
Signal SECO will arise when either the Manual Mode pushbutton is depressed or when the unit is in the Alert condition.
The signal resets with depressure of pushbutton Operate if no Alert condition is present.
Machine On MATE signal comes from D.O.E. signal MATE 1 provided that pushbutton On has been depressed.

d) - End Signal

The "End Read" instruction is normally generated by the CPU (FF FIUC) because there is no character to be interpreted as an end of block character on the PTR 100.
Reading therefore ends on lenght.
In case of an end of tape condition, the End signal is determined by the controller and precisely:

- Read Fwd and End of Tape (Right): DEFI sets BAFI therefore generating FINE + TE 20.
- Rev. Drive and End of Tape (Left): SIFI sets BAFI therefore generating FINE + TE 20.

It is worthwhile to note that NULON and DELITE are service characters and therefore not issued to the CPU.
These characters, according to the switch position, correspond to the following configurations:

	NULL	DELITE
. switch set to pos.A (ISO-7+1bit)	00000s000	11111s111
. switch set to pos.B (IBM FRIDEN)	00100s000	01111s111
. switch set to pos.C (ISO-6+1and 5 Track)	0100s000	1111s111

e) - Formation of TE20

The PTR 100 has a single character read bufferred controller not receiving the check head signals from the D.O.E.
As already explained, the tape has a sync track that generates the character strobe (FACON).
This signal fires one-shot TEBAN, unless NULON or DELIN and drive from program (MOTO) conditions are present.
The characters are always brought to 8 + 1 bits with check bit correction for all tapes but for the Telegraphic type which has no check track.
Transfer of a wrong check will be accepted on this tape.

f) - Error Signal

No error indicator has has been foreseen on the PTR 100.

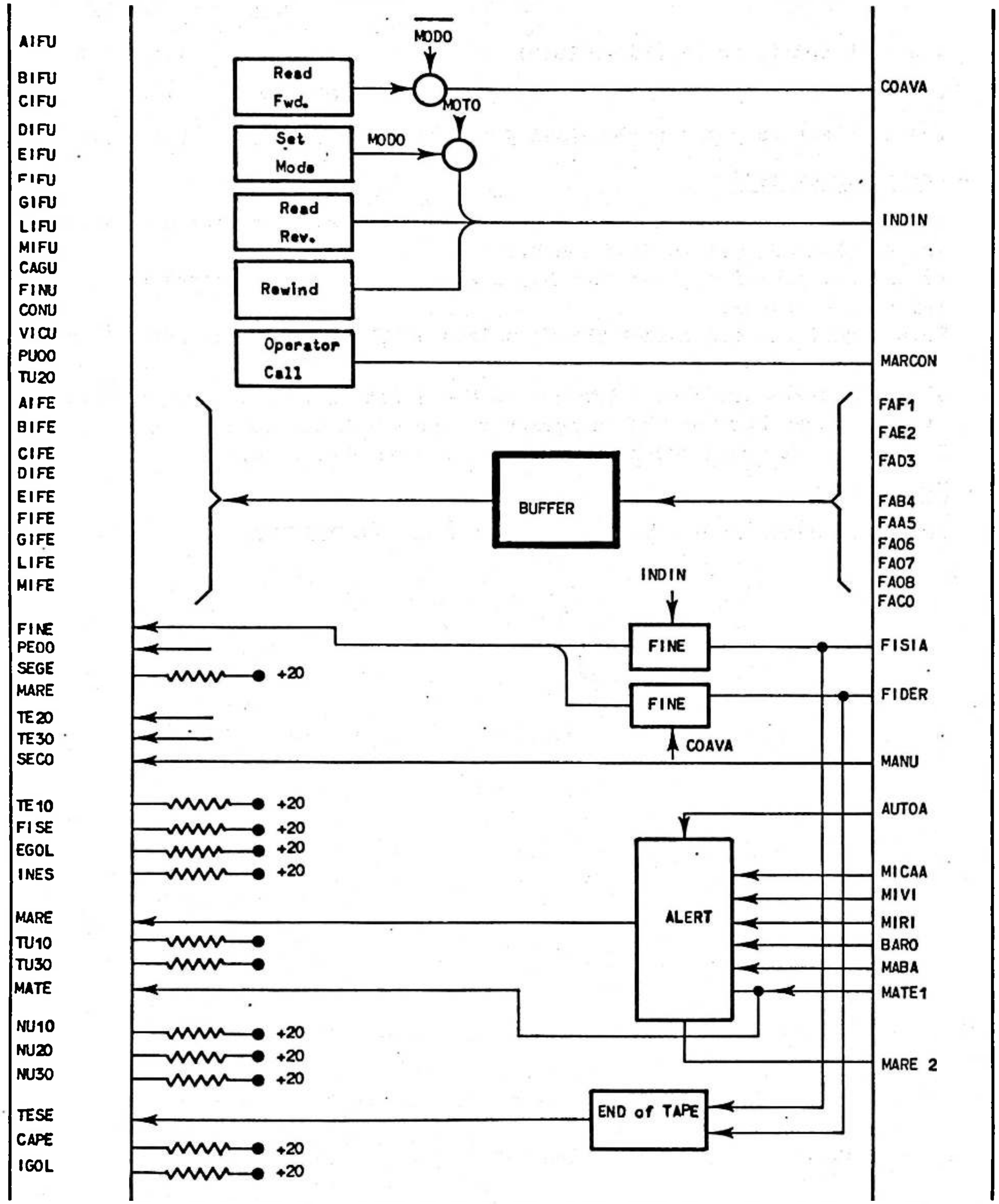


Fig. 4.5 - General Principle Diagram.

4.3.2 - Mechanics Description

4.3.2.1 - Clutch

1) - Purpose

Should the covers be opened during normal reading operations, the clutch discs will disengage causing tape drive to halt.
The motor will meanwhile continue to run to enable a quick re-start as soon as normal conditions are restored.

2) - Operation with Covers Open

When the covers are opened, their shaft cam pushes down the clutch control lever which in turn opens the clutch release disc.
The four spring pressure plate through pins transmit the release disc movement to the lower (free-moving) disc.
This action wins the pressure of the springs and releases the clutch.
The toothed pulley therefore can no longer transmit drive to the main shaft.

3) - Operation with Covers Closed

When the covers are closed their shaft cam no longer act on the clutch control lever.
The continuously rotating pulley is therefore forced toward the upper disc and held in contact with it by the clutch.
Seeing as though this upper disc is fixed to the main shaft the latter will consequently rotate.

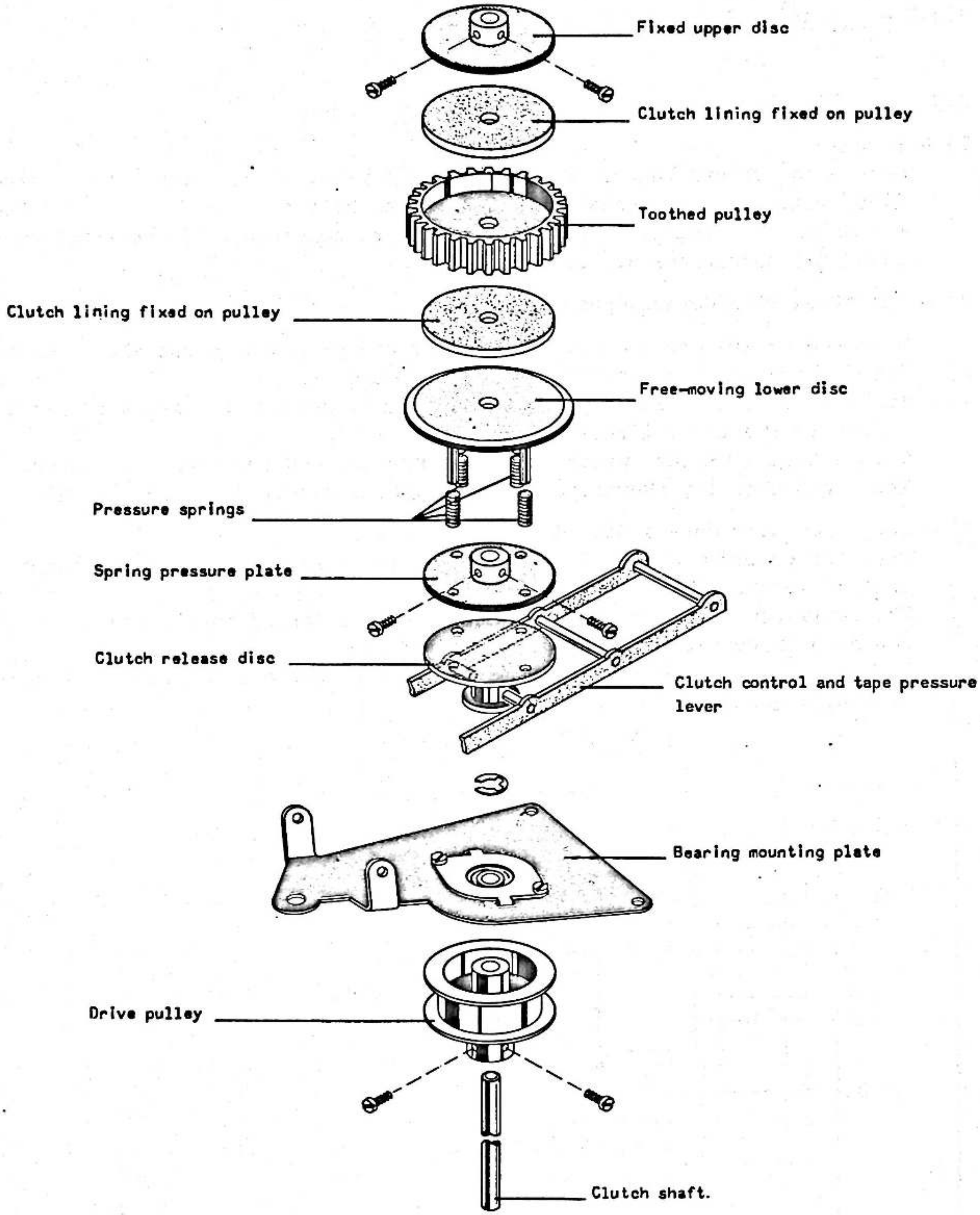


Fig. 4.6 - Clutch Group

4.3.2.2 - Speed Change Assembly

The speed change idler shaft rotates to three positions. In each case it forces a belt tension arm against one of the belts.
These positions are determined and held by the idler shaft cam so that one of the belts is always engaged with the drive shaft.
Each speed will be determined by the ratio of the paired pulleys.
The fourth pulley transmits drive to the plates.

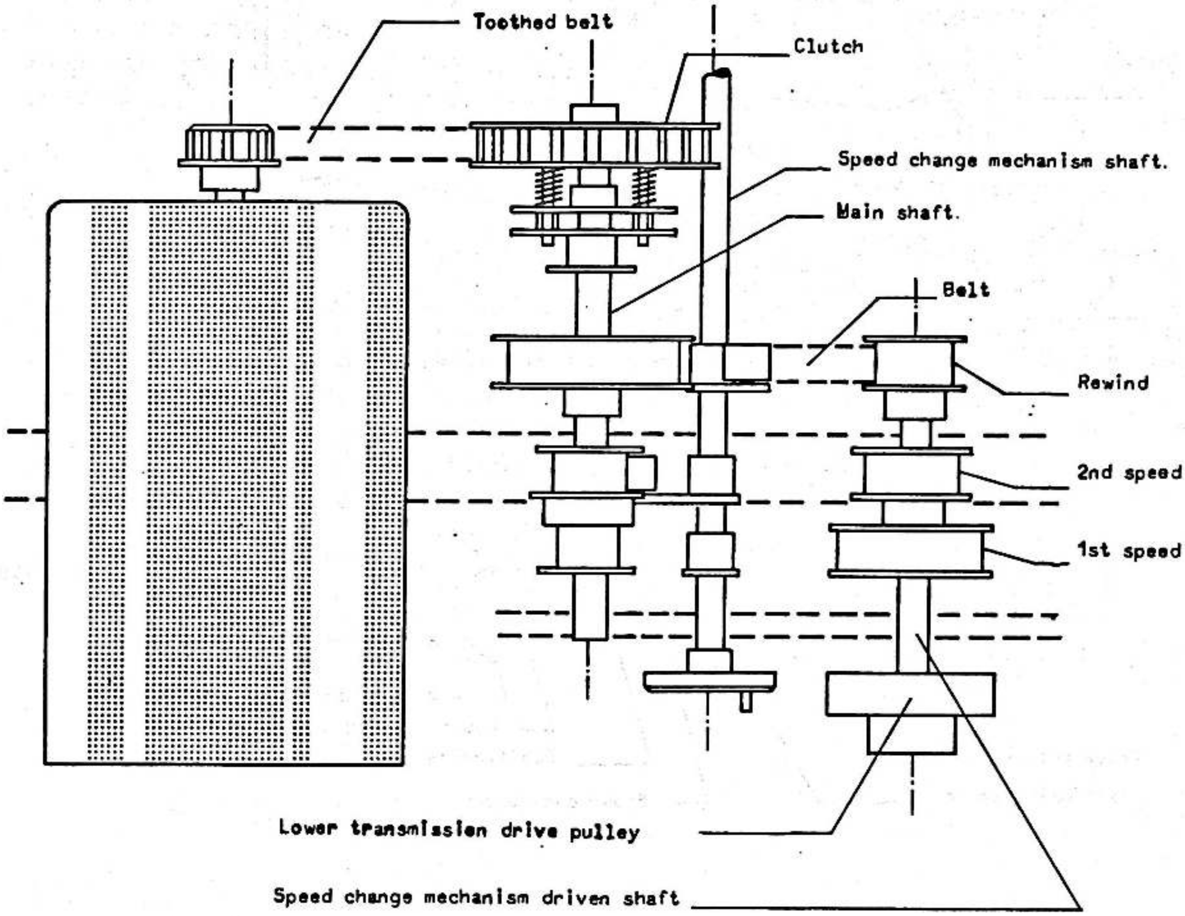

Toothed belt
Clutch
Speed change mechanism shaft.
Main shaft.
Belt
Rewind
2nd speed
1st speed
Lower transmission drive pulley
Speed change mechanism driven shaft

Fig. 4.7 - Schematic Layout of Speed Change Group

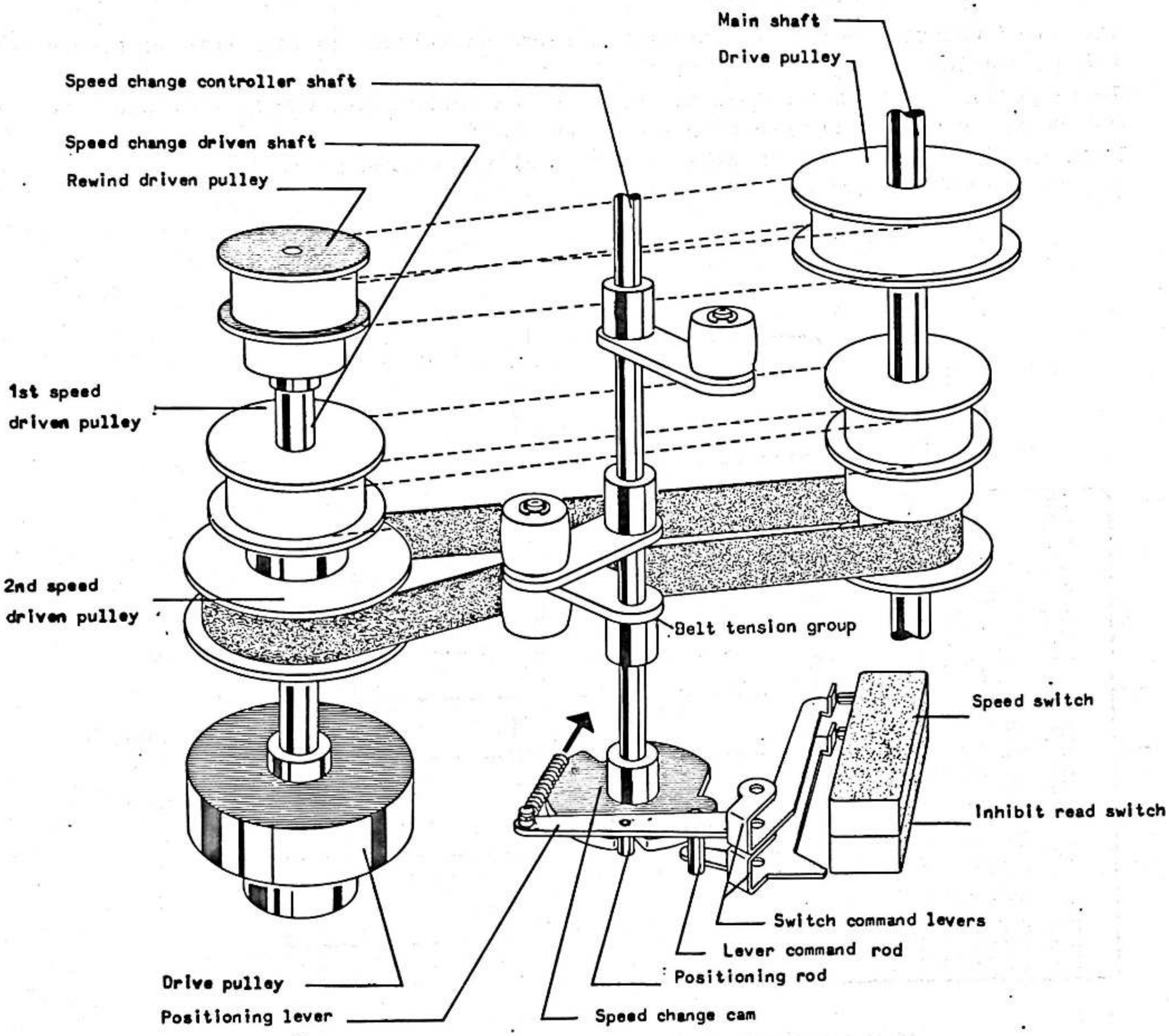


Fig. 4.8 - Speed Change Assembly

4.3.2.3 - Tape Handler Plates and Covers

The tape handler plates are belt connected and driven by the drive pulley mounted on the lower end of the speed-change driven shaft.
The left plate rotates clockwise while the right plate rotates counterclockwise so that, even if the tape receives no drive, it still remains taught between the plates.
For simplicity reasons, the following description only looks into the actions of one of the plates.
When the covers are closed, the clutch imparts rotation to the plate which brings into action the cover's free-turning disc.
The latter will not rotate at the same speed until its two disc pins fully engage two of the four plate hub holes.
When this event takes place plate/disc drive will result perfect, allowing good tape wind-up and unwinding operations.

4.3.2.4 - End of Tape Detector

This mechanism stops the machine should an End of Tape condition be revealed on either of the tape handler plates, as described below.
Each removable tape handler hub presents an appropriate race to receive the sensor arm rib when no tape is loaded on the subsystem.
The sensor arm is spring loaded to constantly follow the external diameter of the tape roll fitted on the hub.
When the tape completely unwinds from the hub, the sensor arm's rib enters the hub race to set the End of Tape condition switch and stop the machine.

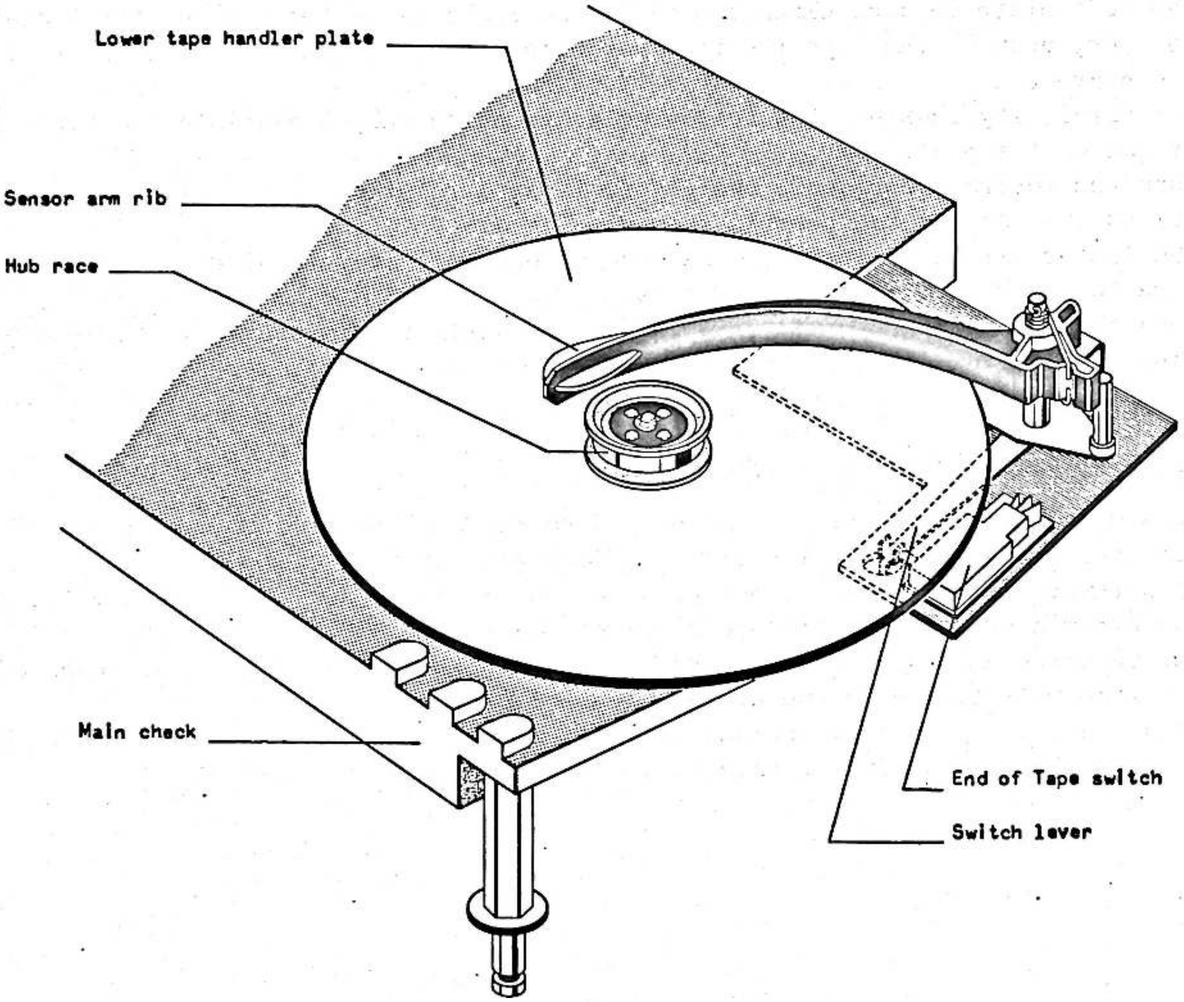


Fig. 4.9 - Handler Plate and Sensor Arm

4.3.2.5 - Tape Tension Arms

As the covers are lowered (tape loaded) the cam command levers group will be called upon.
Partial rotation of this cam will cause the positioning lever to move counterclockwise, pulling-in the tape tension arm by means of a spring.
This movement tends to pull the tape tight.
When the tape starts moving (in either direction) there is a momentary take-up of slack as a result of inertial force, while there is a momentary increase in accumulated slack when tape drive is halted.
As long as these variations (slack tape loops) result small, they are compensated by the mere action of the damper balance lever, through its spring; but as these become greater the balance lever's end of run post swings to hook-up the tension arm, bringing the arm into play so as to avoid tape breakeages.
Fixed by eccentric pins, two skids are placed on the end of the tension arm.
The skids run on a metal guide and either offer resistance against tape drive, when the arm is commanded by slack tape loop being taken-up, or offer no resistance to tape drive when the loop increases.
Tape action on the tension arm rollers gives way to a slight flection of the arm itself.
This brings the skids in touch with the metal guide, developing a braking action that will prevent tension arm resonance oscillations and consequent better tape drive.

4.3.2.6 - Arms Exclusion System

As the covers are opened, the two End-of Tape sensor arms are forced to the outer edges of the handler plates so as to ease tape roll loading or removal operations.
Via its connection arm, the balance lever is submitted to clockwise movements which are transformed into counterclockwise movements on the cam through the balance lever to cam fixing arm.
This latter movement will cause:

- the sensor arms to move to the outer edges of the plates.
- the positioning lever to move toward the tension arm, releasing the damping spring.

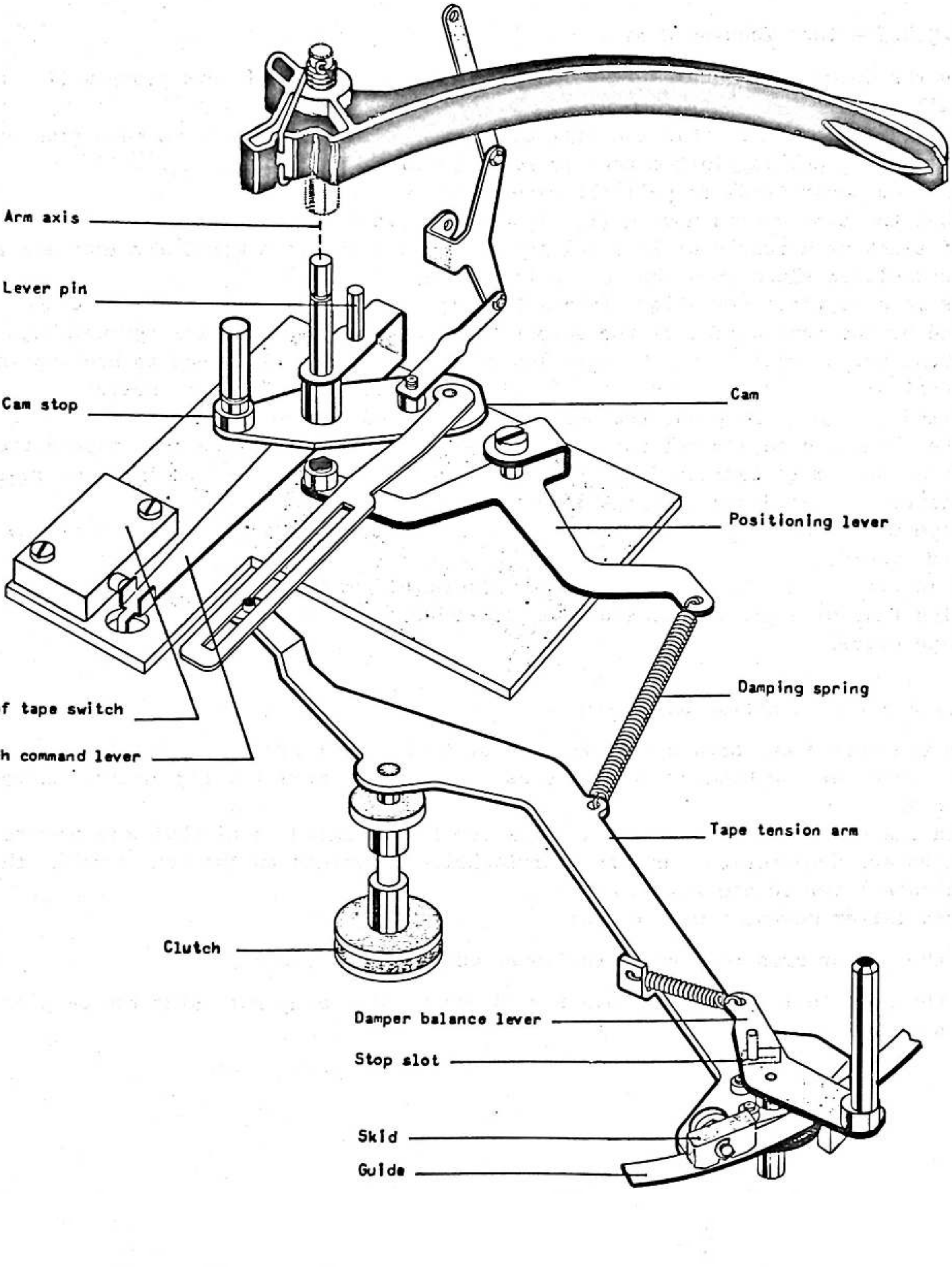


Fig. 4.10 - Tape Tension Arm Lever (with covers open).

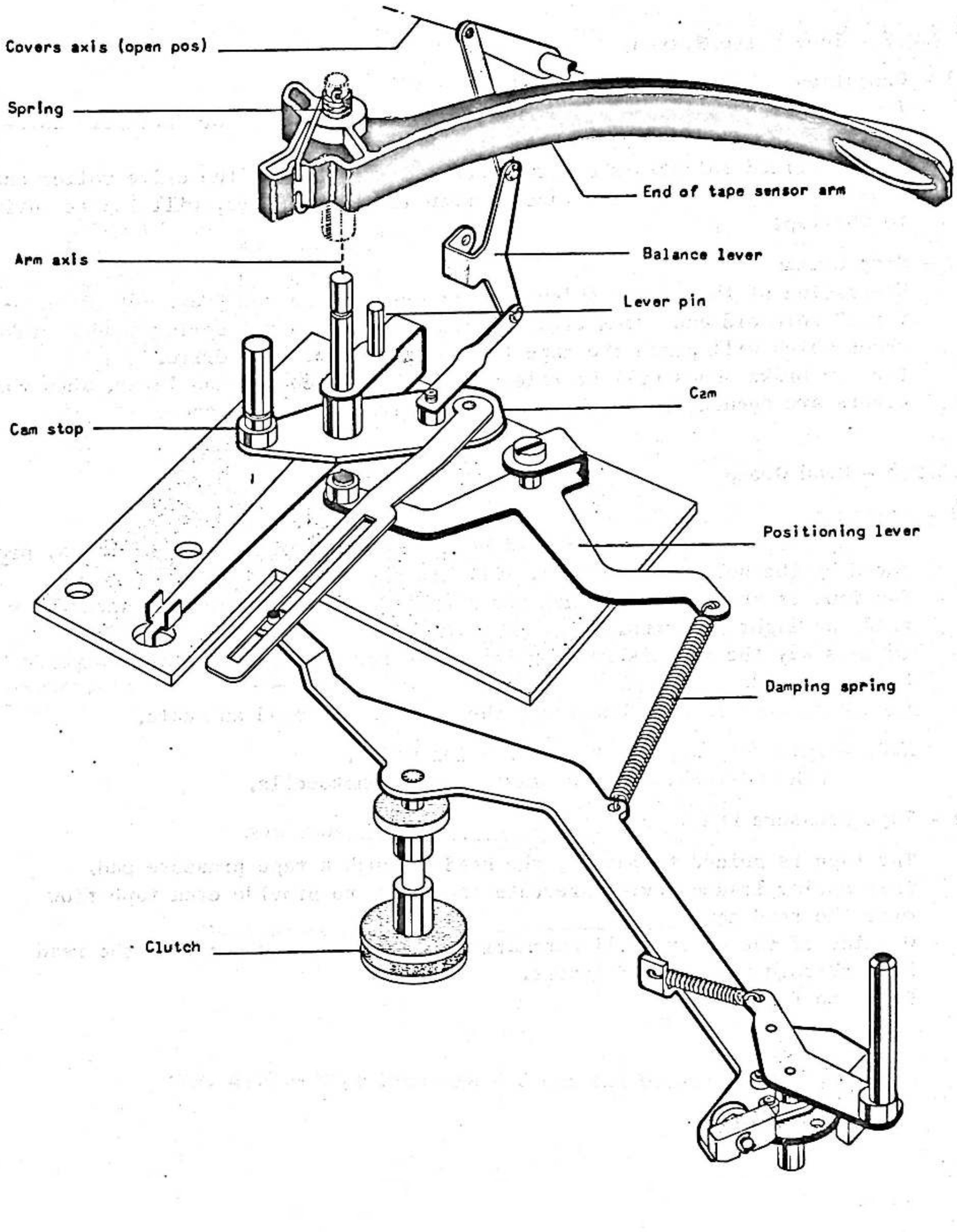


Fig. 4.11 - Arms Exclusion Devices

4.3.2.7 - Tape Drive System

1) - Operation

Tape movement is generated by energizing the "Forward" or "Reverse" solenoid through a D.O.E. controller issued signal.
The energized solenoid's armature nears its roller to the drive roller and consequently, pinching the tape between the two rollers, will impart drive to the tape.

2) - Stop Command

Energizing of the "Stop" solenoid will de-energize the "Forward" or "Reverse" solenoid and automatically call into action two spring loaded brake shoes which will pinch the tape to instantly block its drive.
The two brake shoes will be released by the clutch command lever, when the covers are opened, to enable loading and removal of the tape.

4.3.2.8 - Read Group

1) - Operation

As they pass in front of the read head, the focussed lamp light beams, produced by the holes in the tape, will hit the photocells.
Two rows of photocells are mounted parallel to each other to sequentially read the light patterns.
In this way the tape is read by the first row of photocells and compared by the second.
Should comparison give equality, the signals are used as data.

N.B. - This only applies to the PTR 101 model.
PTR 100s only mount a single row of photocells.

2) - Tape Pressure Pad

The tape is guided to pass by the head through a tape pressure pad.
This spring loaded device prevents tape skew to provide even tape flow over the read zone.
Opening of the covers will automatically withdraw the pad from the read head through a series of levers.
Refer to fig. 4.12.

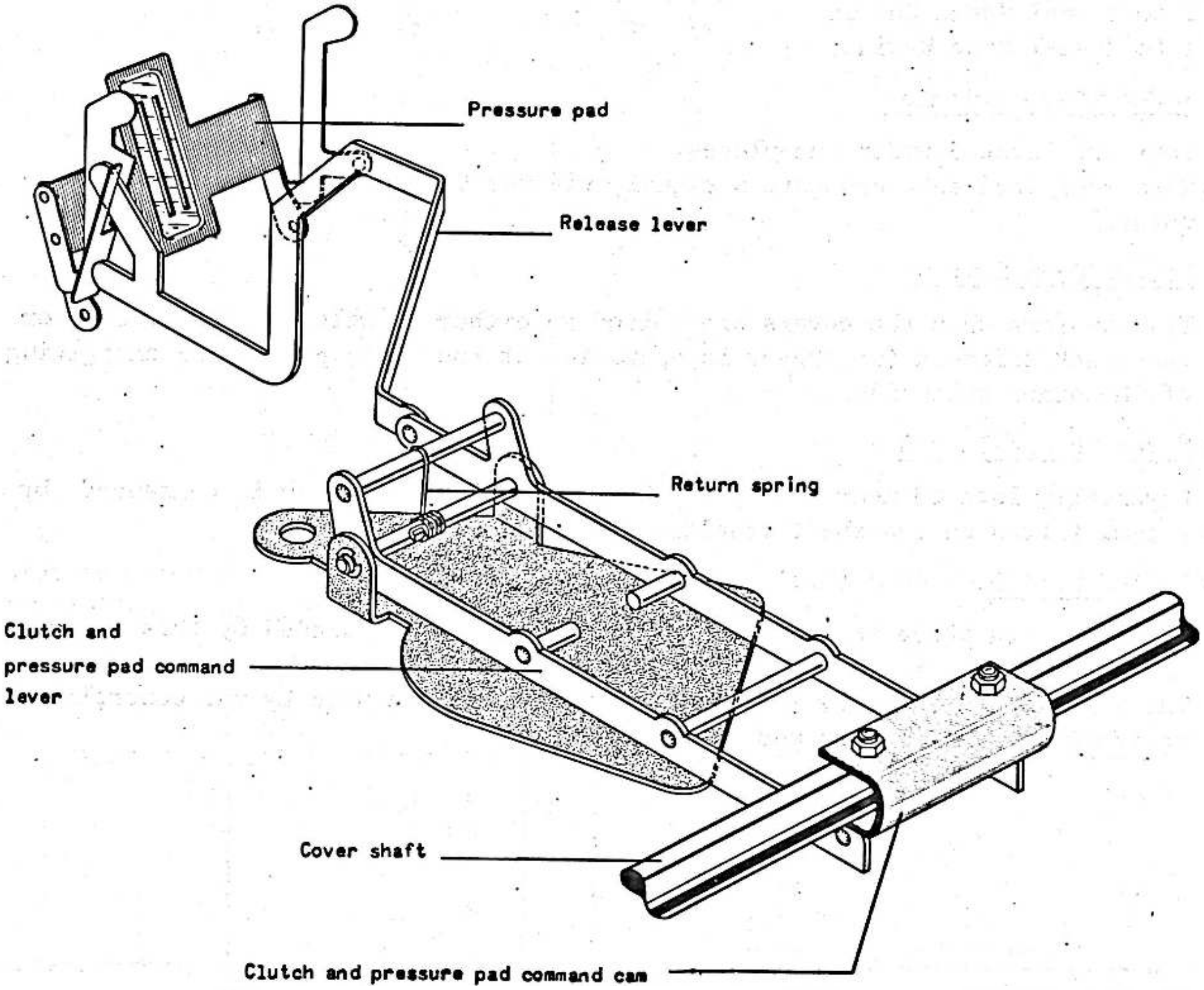

Pressure pad
Release lever
Return spring
Clutch and pressure pad command lever
Cover shaft
Clutch and pressure pad command cam

Fig. 4.12 – Tape Pressure Pad Command Levers

4.3.2.9 - Machine Condition Switches

The subsystem incorporates the following switches:

- 2 to detect End-of-Tape
- 1 to sense the Covers Open condition
- 1 to signal Speed Change
- 1 to signal tape Rewind.

- End-of-Tape Switches

They are located under the plates.
When energized they generate a signal, via the Controller, to stop the drive motor.

- Covers Open Switch

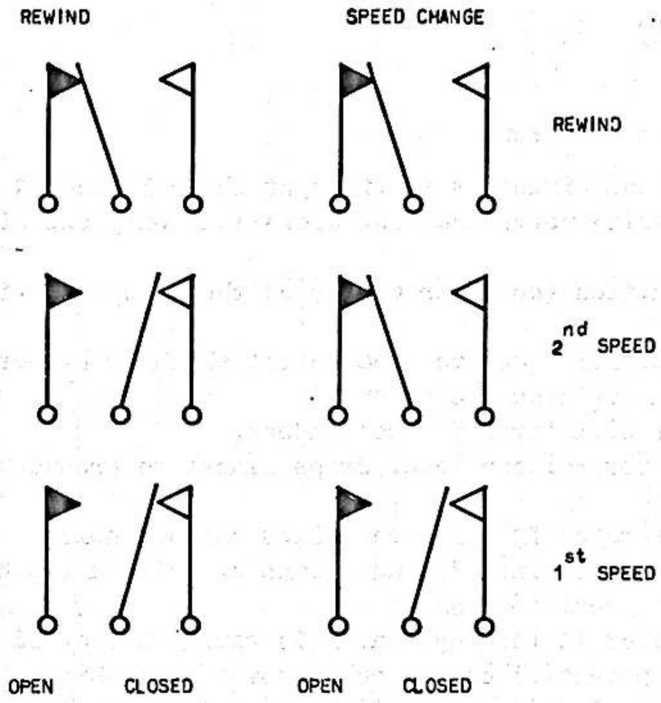
It transfers when the covers are raised to either disable the "Forward" or "Reverse" solenoid (whichever is operating at the time) preventing energizing of the other solenoids.

- Speed Change Switch

Physically located near the speed change shaft, this switch is commanded by a cam, fitted on the shaft itself.

- Rewind Switch

It is mounted above the speed change switch and is commanded by this switch shaft cam during rewind operations.
The signals generated by these last two switches are used by the controller to identify the 1st, 2nd and rewind speeds.



Starting from a Rewind condition, the two switches will transfer according to the following diagram.

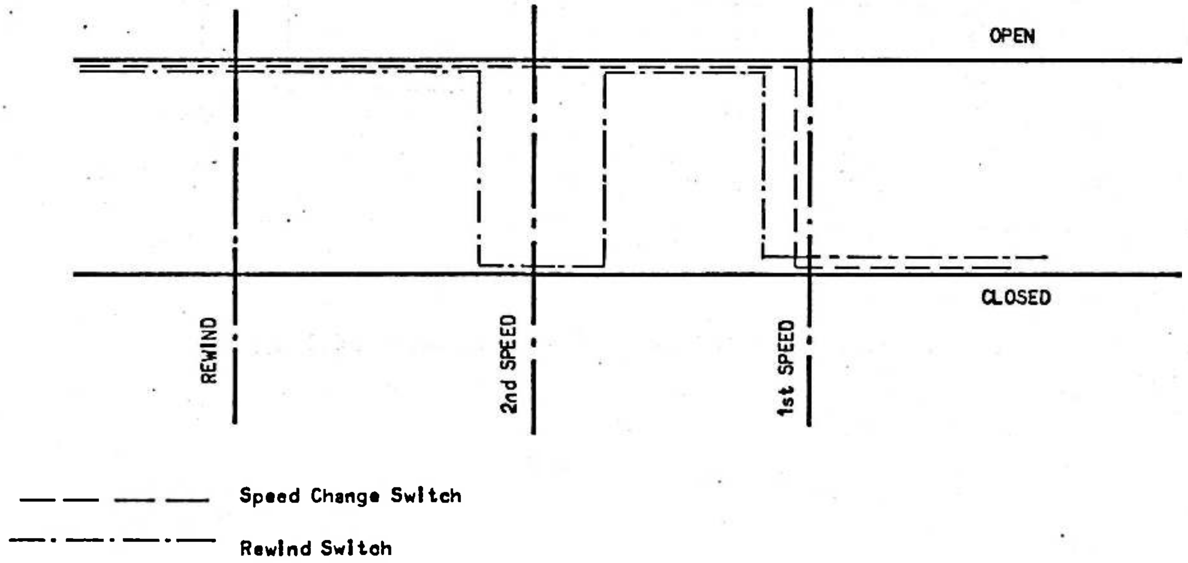


Fig. 4.13 - Machine Switches

4.3.3 - Special Circuits

4.3.3.1 - Actuators Command Circuit

I1 is the actuator command circuit's start input while I2 and I3 are used to disable the circuit. During normal machine operation, only one of the 3 inputs is powered.
In a non-operating condition (no power on any of the 3 inputs) T1 is cut off while T2 is saturated.
The collector of T2 therefore goes to a potential slightly higher than ground, cutting off T3 and de-energizing the solenoid.
A positive input at I 1 will force T 1 to conduct.
The transistor's collector voltage level drops almost to ground consequently cutting off T 2.
The + 20 V, via R5, saturates T3 which energizes the solenoid.
Oscillations caused by the solenoid's inductance are eliminated by D3 while the R 7 - C 1 bias damps the positive peaks..
A positive input at I 2 or I3 (no input at I 1) causes D 1 or D2 to conduct.
This brings a positive potential on the collector of T 1 which will result greater than the level applied to its collector during saturation of the transistor.
Even if a positive input is fed to I 1 therefore, T 1 will be prevented from saturing.
As long as T 2 remains on, T 3 is cut off and the solenoid is de-energized.

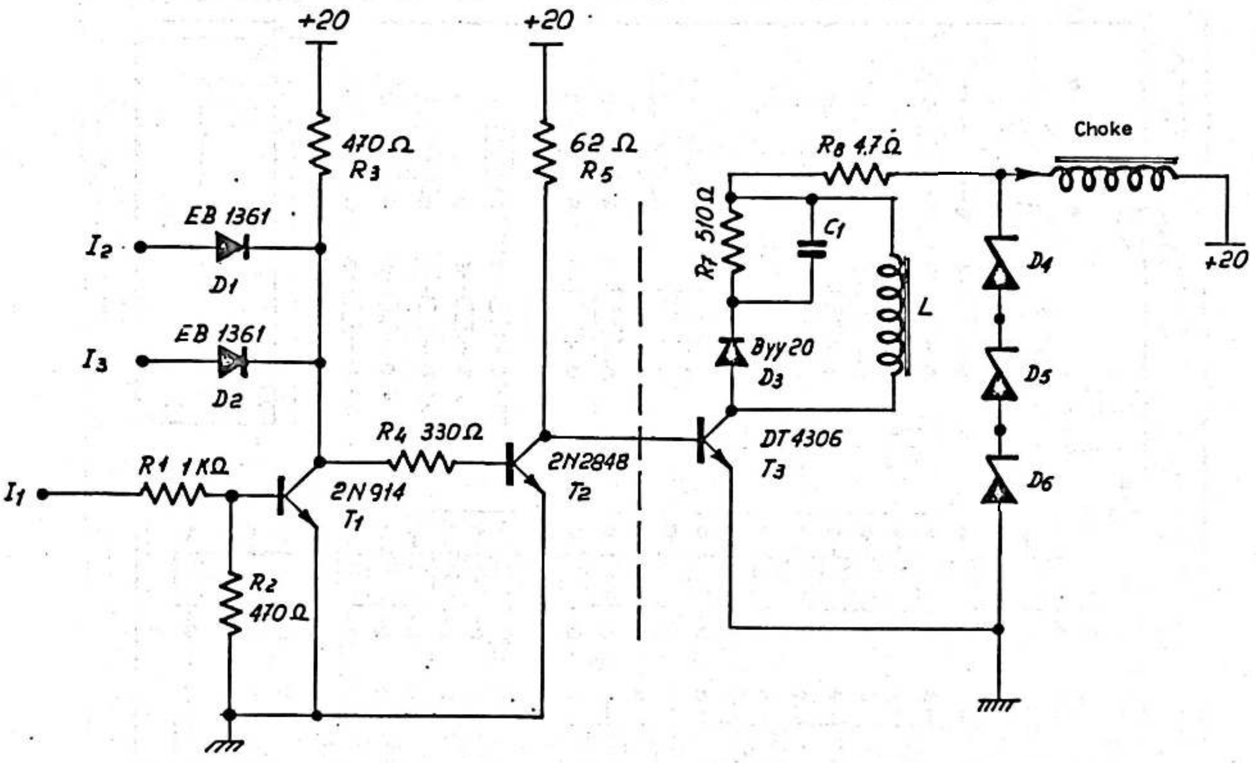


Fig. 4.14 - Actuators Command Circuit Diagram.

4.3.3.2 – Special Boards

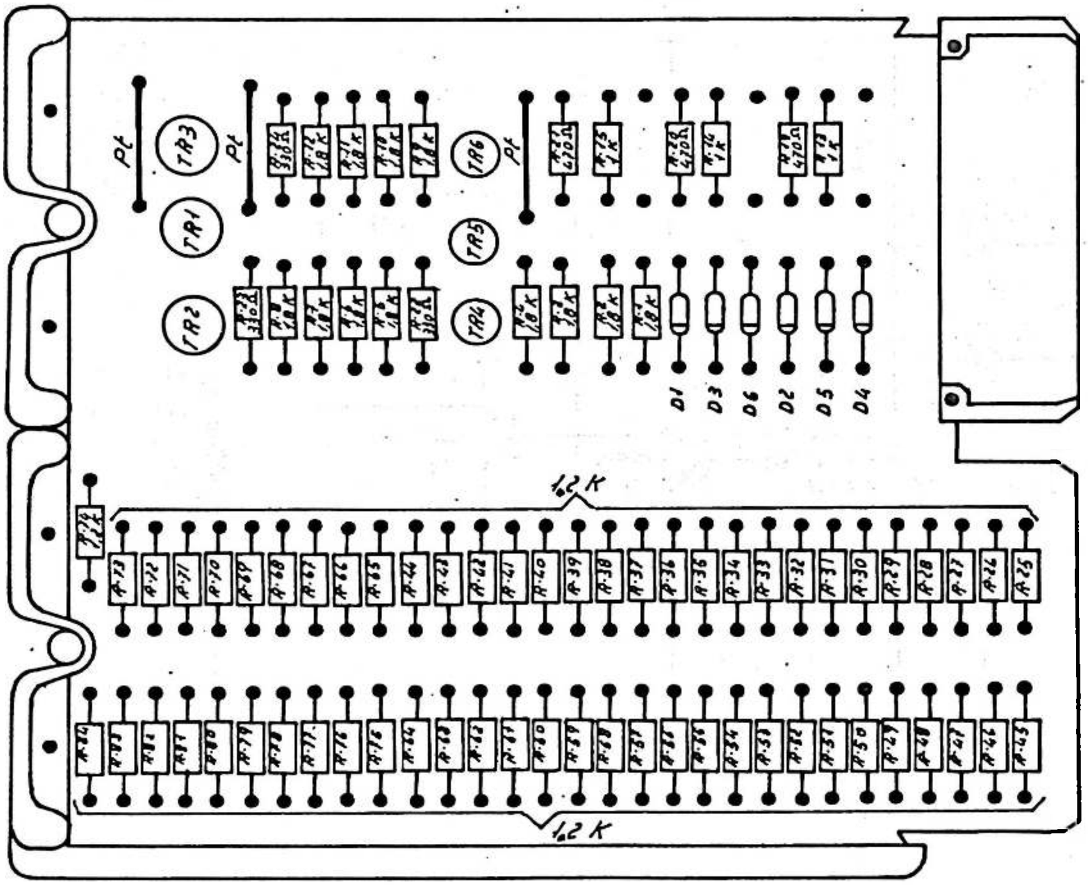


Fig. 4.15 – Power Stages Driver (PWB FOT 1 A
P/N 06132312)

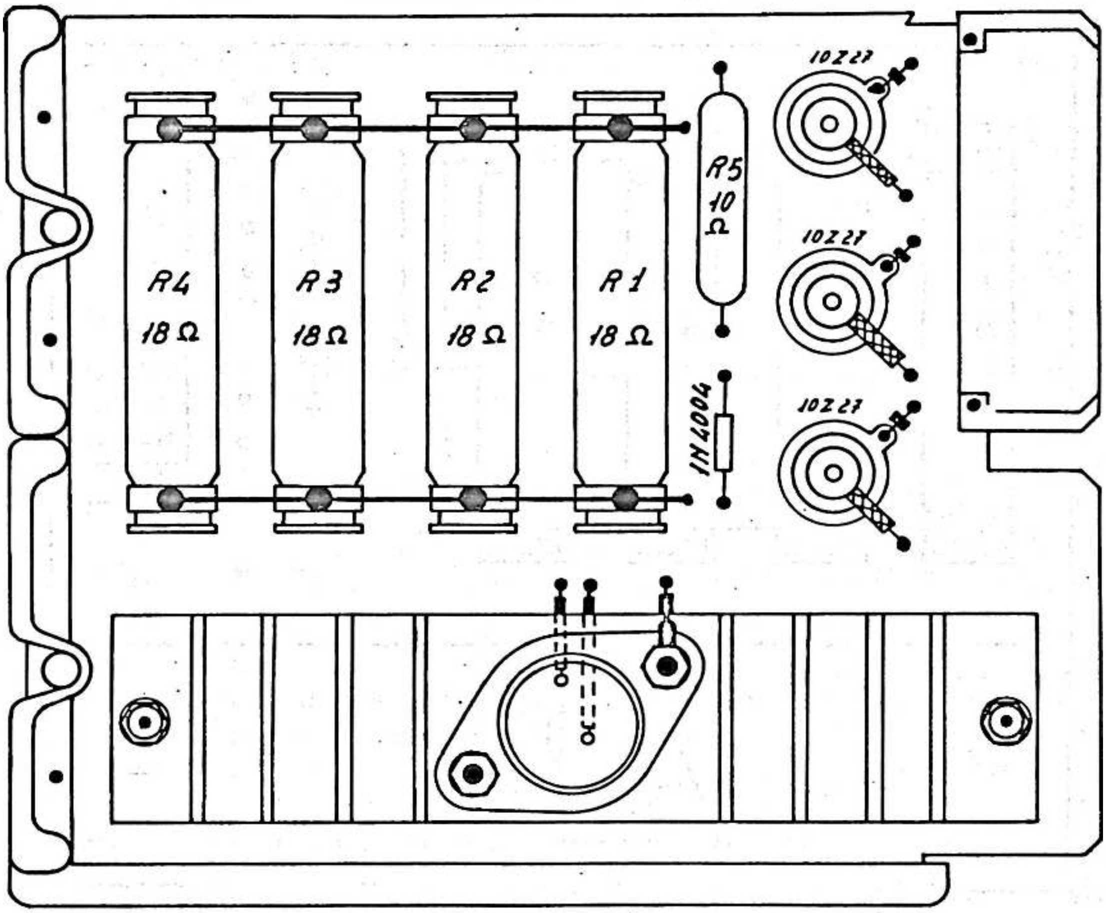


Fig. 4.16 - "Stop" Command PWB

(FOT 3 P/N 0613233 for PTR 101)
(FOT 4 P/N 0613234 for PTR 100)

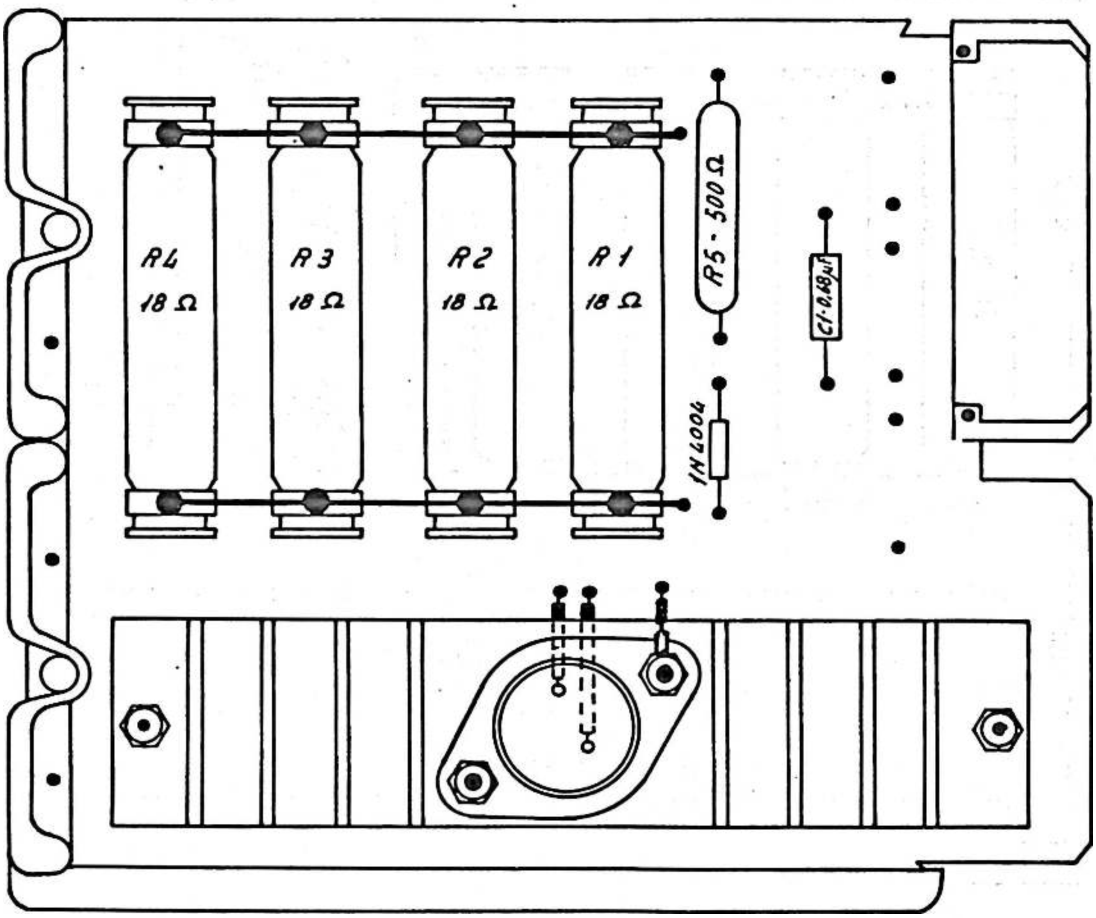


Fig. 4.17 - "Forward" or "Reverse" Power Stage
(PWB FOT 2 P/N 0613232 D)

4.4 - FUNCTIONAL DESCRIPTION

4.4.1 - Operating Modalities

- No annotation

4.4.2 - Timing Sequences

- No annotation

4.4.3 - Options

4.4.3.1 - Readable Codes

After appropriate setting, the controller may issue to the CPU one of the following codes:

- ISO 7
- ISO 6
- FRIDEN
- IBM
- Telegraphic
- T.T.S.
- AUDIT

Figures 4.18 to 4.24 show symbolic characters (punched on tape) to interface configuration correspondence.

4.4.3.2 - ISO 7 Code

This code is composed of 2^7 characters (128) that is to say 7 combined tracks plus 1 (8 th) for parity check.
Also punched on the tape is the sprocket (drive) hole.

4.4.3.3 - ISO 6 Code

Composed of 1^6 characters (64) that is to say 6 combined tracks plus 1 (7 th) for dispaity check. Also punched on the tape is the sprocket (drive) hole.

4.4.3.4 - FRIDEN Code

Composed by 65 characters obtained through the combination of tracks 1-2-3-4-6-7-8.
Disparity check is on track 5. Also punched on the track is the sprocket (drive) hole.

4.4.3.5 - IBM Code

This code is composed by 65 characters obtained through the combination of tracks 1-2-3-4-6-7-8. Disparity check is on track 5.
Also punched on the tape is the sprocket (drive) hole.

4.4.3.6 - Telegraphic Code

Formed by 32 characters obtained from the combination of 5 tracks, this code lacks a track for the parity or disparity check.
Also punched on the tape is the sprocket (drive) hole.

4.4.3.7 - TTS Code

The TTS (Typesetting) code is formed by 64 characters obtained by the combination of 6 tracks.
Lacks a track for parity or disparity check.
Also punched on the tape is the sprocket (drive) hole.

4.4.3.8 - AUDIT Code

This code is formed by 51 characters obtained through the combination of 6 tracks.
Lacks a parity or disparity check track and no sprocket (drive) hole is punched on the tape.

4.4.4 - Test Function

- No annotation.

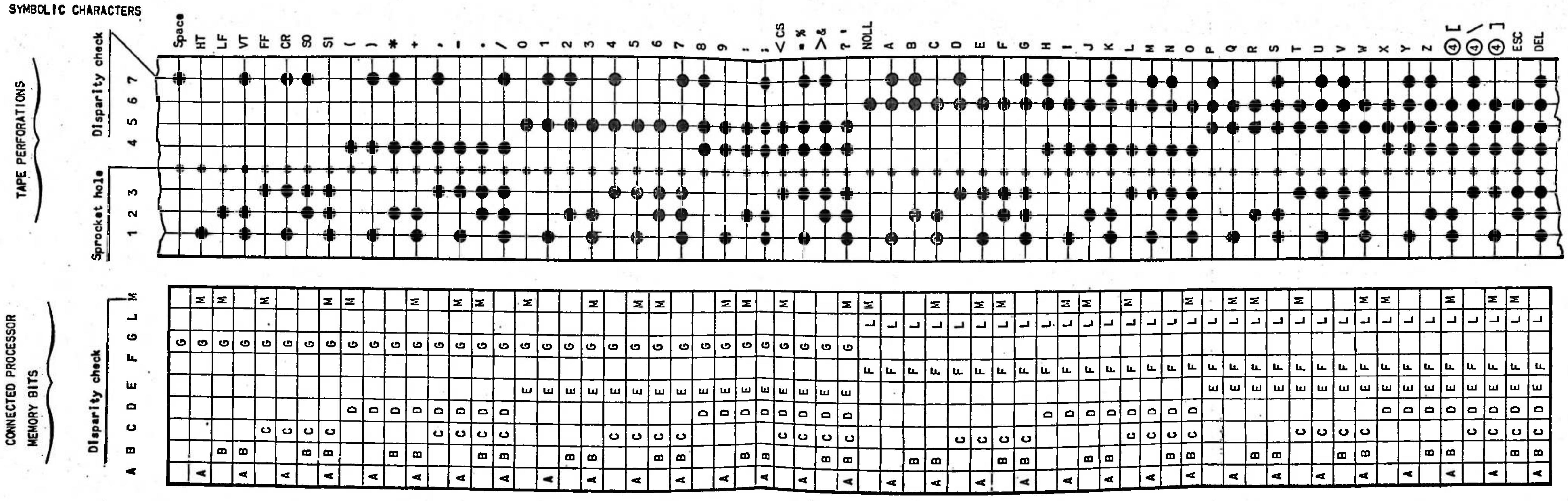


Fig. 4.19 - ISO 6 Code

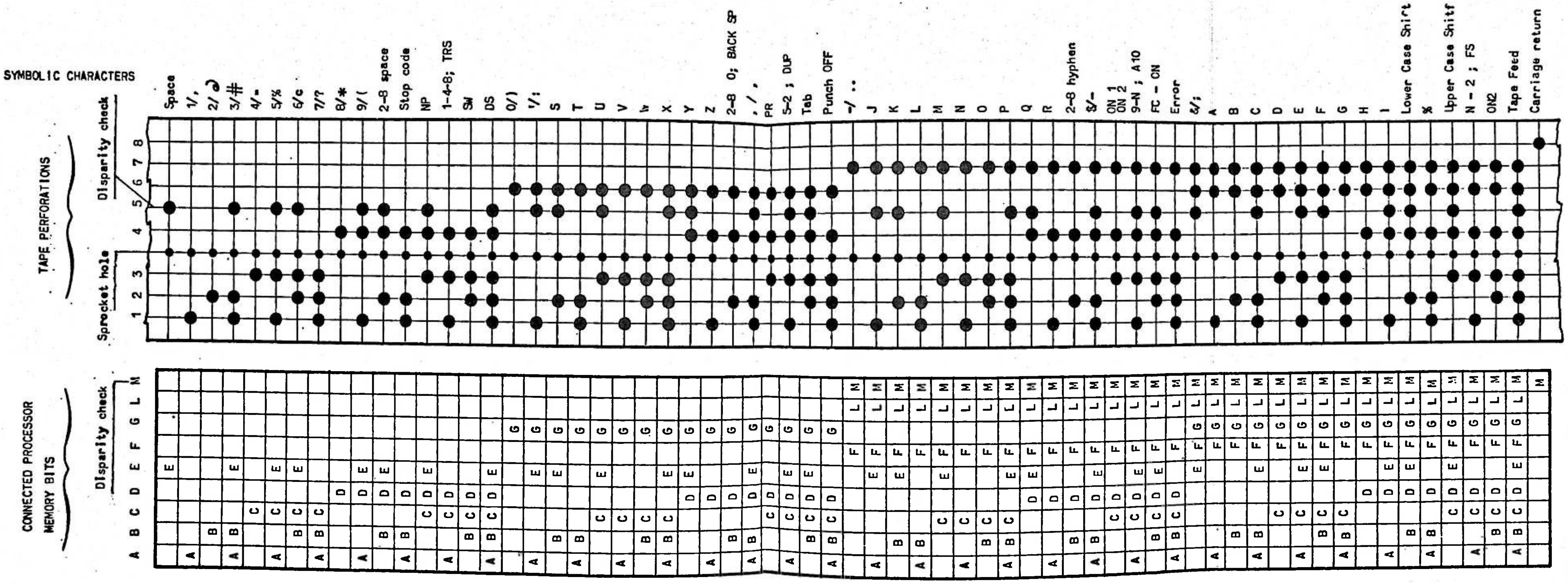


Fig. 4.20 - FRIDEN Code

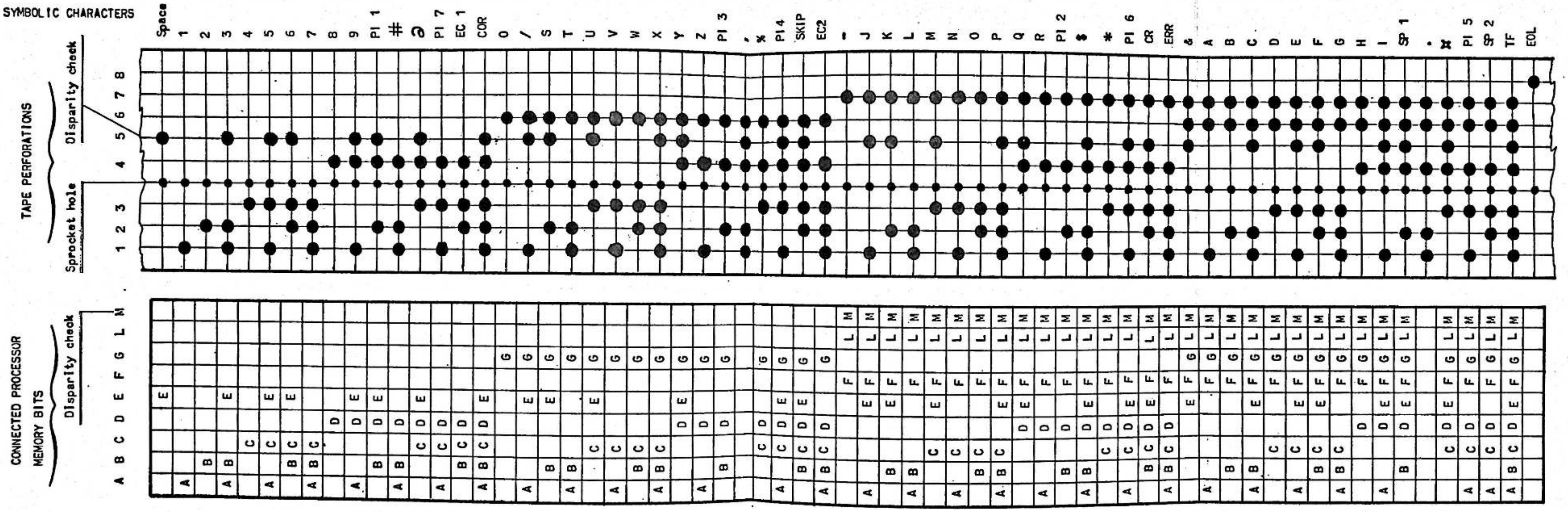


Fig. 4.21 - IBM Code

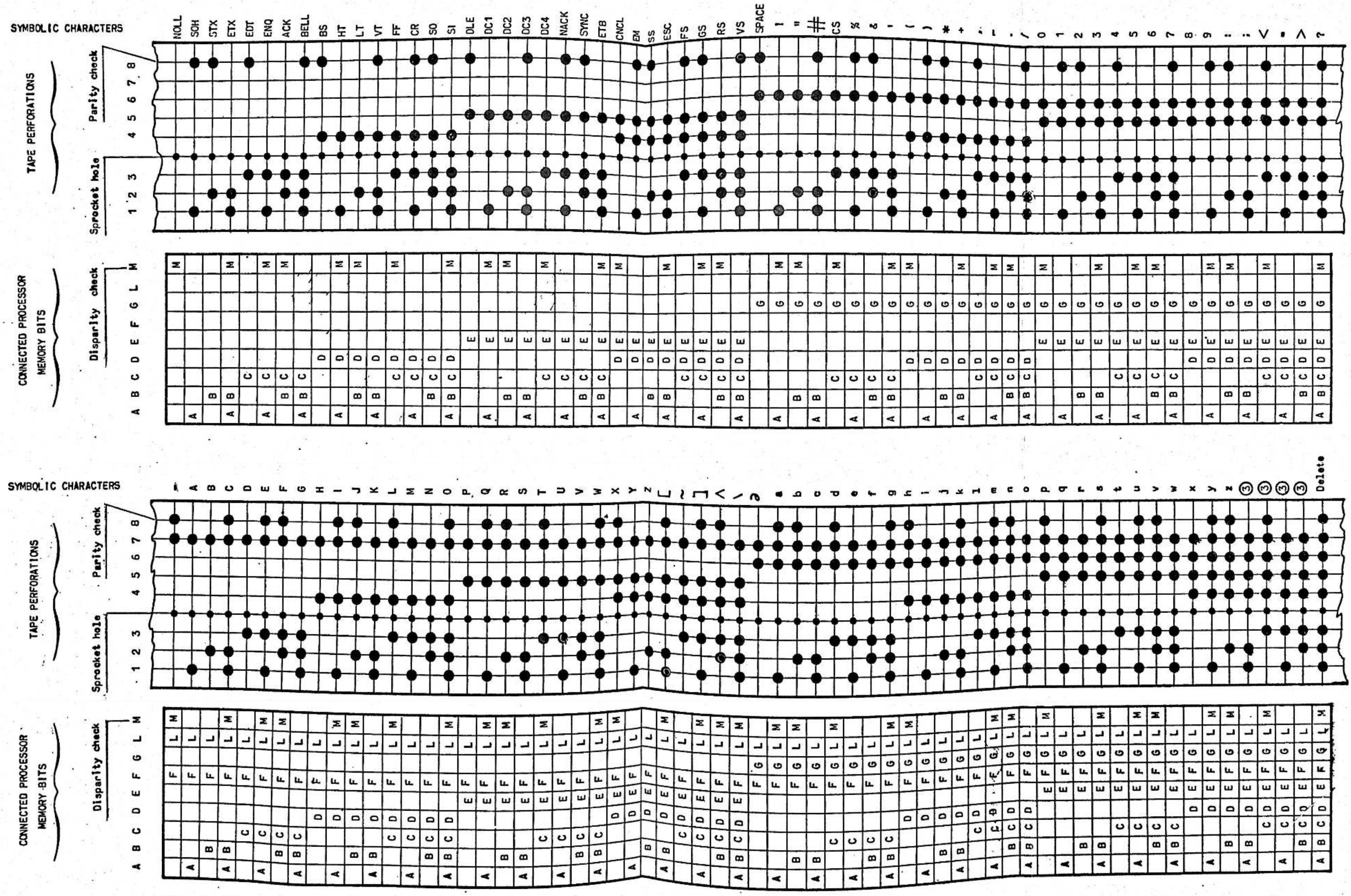

SYMBOLIC CHARACTERS
NOLL SOH STX ETX EDT ENQ ACK BELL BS HT LT VT FF CR SO SI DLE DC1 DC2 DC3 DC4 NACK SYNC ETB CNCL EM SS ESC FS GS RS VS SPACE ! " # CS % & ' ( ) * + , - . / 0 1 2 3 4 5 6 7 8 9 : ; < = > ?
TAPE PERFORATIONS
Parity check
8 7 6 5 4
Sprocket hole
3 2 1
CONNECTED PROCESSOR MEMORY BITS
Disparity check
M L G F E D C B A
SYMBOLIC CHARACTERS
@ A B C D E F G H I J K L M N O P Q R S T U V W X Y Z [~] < > ? a b c d e f g h i j k l m n o p q r s t u v w x y z ③ ③ ③ ③ Delete
TAPE PERFORATIONS
Parity check
8 7 6 5 4
Sprocket hole
3 2 1
CONNECTED PROCESSOR MEMORY -BITS
Disparity check
M L G F E D C B A

Fig. 4.18 - ISO 7 Code

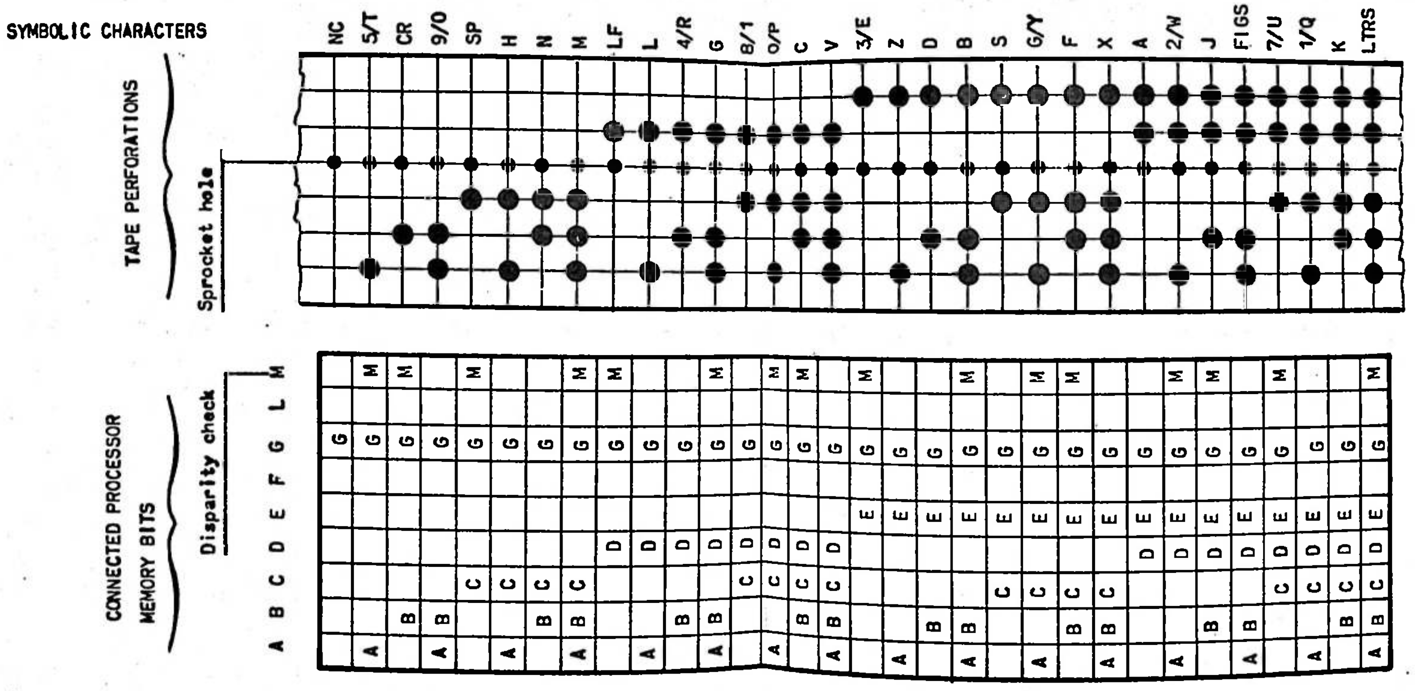


Fig. 4.22 - Telegraphic Code

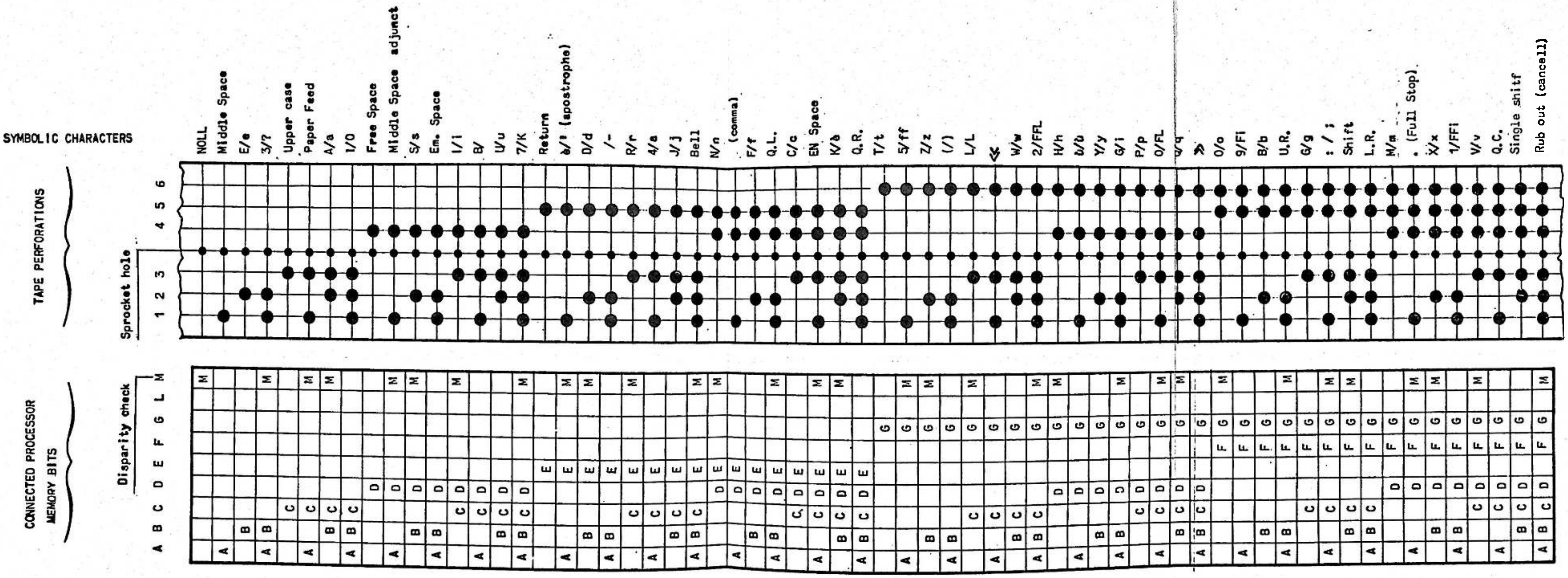
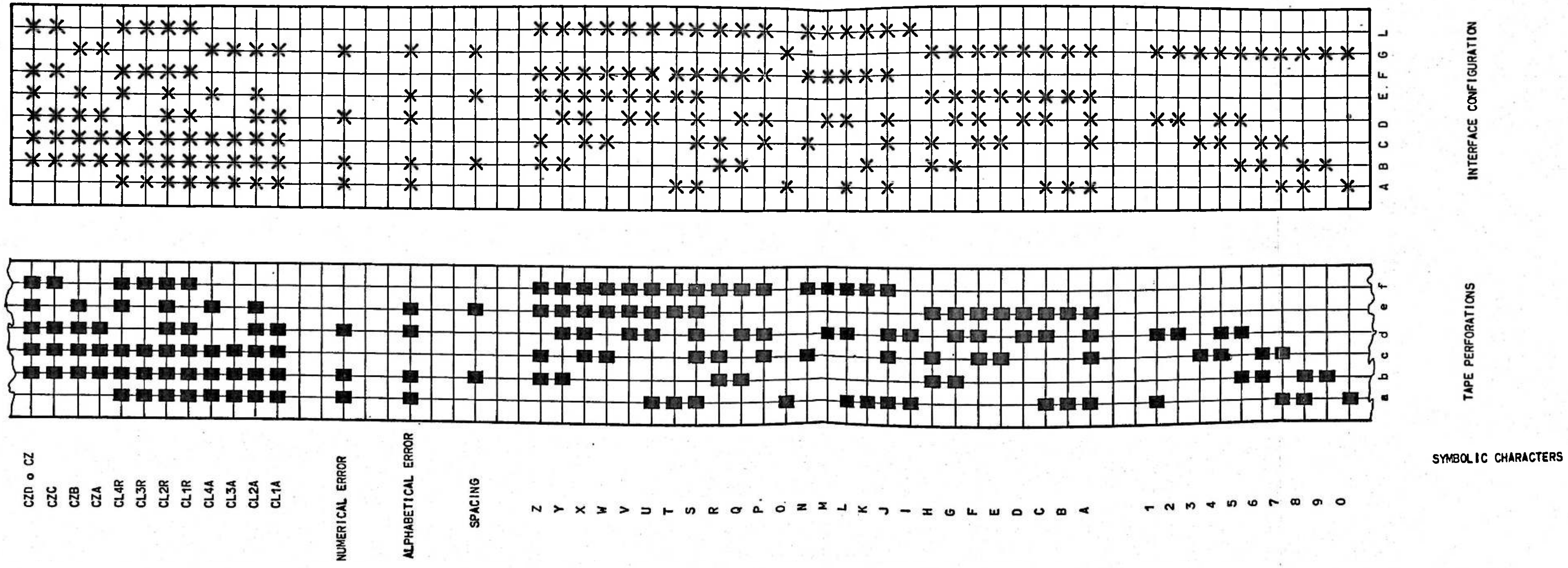


Fig. 4.23 - TTS Code



Note : - Disparity check does not appear on the interface configuration.

Fig. 4.24 - AUDIT Code

2

GE 115

PAPER TAPE READER CONTROL UNIT (GIB 420)

(Machine Description)

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1. GENERAL

1.1. PURPOSE AND COMPOSITION

The GIB 420 is the Control Unit for the PTR 500 and occupies two rows of the Reader Cabinet.
The letters GIB signify :

G = Governor (Control Unit)
I = Input
B = Band (Paper tape)

The GIB 420 may be connected, through a Type 4000 OGE Standard Interface, to any of the following Systems :

1) - ELEA 4001/A
2) - ELEA 4001/B
3) - ELEA 4-115

The PTR 500 can read the following types of paper tapes :

1) - ISO - 7+1 channels	(Selector in position A)	P003
2) - ISO - 6+1 channels	(Selector in position C)	P001
3) - IBM & FRIDEN	(Selector in position B)	P002
4) - Telegraph tapes	(Selector in position C)	P001

In addition to tape-type selection, the Control Unit provides tape-speed selection as follows :

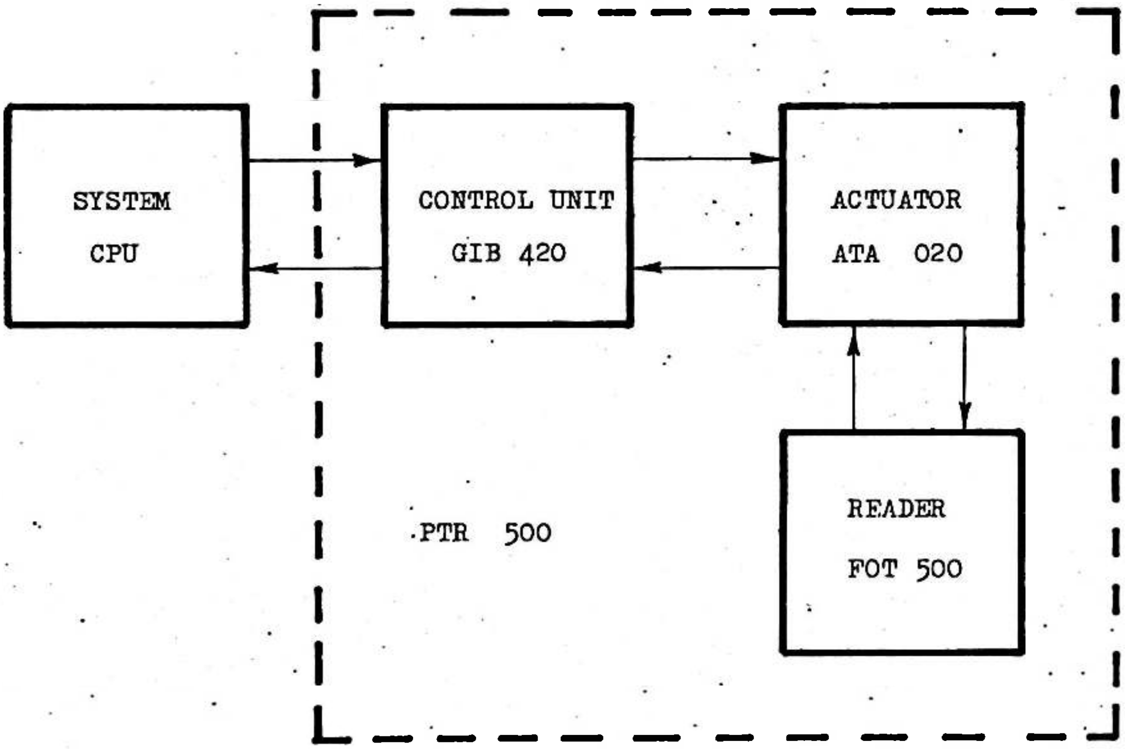
1) - Position A - low speed - 250 character per second.
2) - Position B - medium speed - 500 characters per second.
3) - Position C - high speed - 775 characters per second.

The tape utilizes a sprocket channel to maintain proper synchronization.
The Control Unit provides lamp indications for the following conditions :

1) - Unit Selected (PU00)
2) - Unit busy (UNOC)
3) - Unit out of service (MARE)

The Control Unit functions between the system CPU and the PTR 500 Actuator ATA 020 as shown in figure 1.

Fig. 1 - Unit Interconnection, Basic Block Diagram



1.2. PRINCIPLE OF OPERATION

The PTR 500 acts upon command signals from the CPU to read a variety of paper tapes. The GIB 420 controls photoreader FOT 500 through actuator ATA 020.

The GIB 420 accepts and decodes 8-bit-plus-parity digital commands from the CPU. A series of control signal exchanges allow the reader and CPU to operate asynchronously.

The GIB 420 accepts the reader output, stores the character, and informs the CPU of its presence. The CPU reads the character out pf the GIB 420 along with character parity.

The GIB 420 itself is devoid of error detection circuits.

The GIB 420 Controls the Actuator with timing signals developed as a result of CPU commands.

2. CONTROL UNIT LOGIC

2.1. MACHINE COMMAND INPUTS

The GIE 420 accepts the following commands from the system CPU.

2.1.1. 64 Command - Read Forward

Reading is continuous in forward direction until commanded to stop by CPU signal FINU.
To allow reading of the last character it is required that FINU arrives while the read photocells are lighted by the last character FINU must occur no later than 250 µsec after the last character read is initiated.
At the end of reading the Control Unit remains conditioned to again read forward.

2.1.2. 65 Command - Read in Reverse

Reading is continuous in reverse direction. This is initiated by setting FF MODO. MODO and MOTO combine to form INDIN which reverses the drive mechanism. The FINU logic is as described for forward reading.

2.1.3. 160 Command - Reverse Enable

The machine is conditioned to read in reverse direction only. All subsequent character requests then result in reverse reading.

2.1.4. 68 Command - Rewind

The tape is rewound until signal FISIA terminates the rewind.

2.1.5. 172 Command - Operator Call-Manual Mode

The machine is placed in manual mode.
Unit-busy signal UNOC results. The machine may be placed in automatic mode only by pressing the AUTOMATICO pushbutton on the operators Control Panel.

2.2. MACHINE STATUS OUTPUT SIGNALS

The GIB sends the following status signals to the CPU.

2.2.1. PEOO - Control Unit Available (fig. 5)

The PEOO signal is sent to the CPU under the following conditions :

1) - After general reset CAGU is received from the CPU.

2) - At the end of a read operation or a rewind.

3) - When the console AUTOMATICO switch is pressed, provided there is no out-of-service condition present. Tape movement simulates an out-of-service condition.

2.2.2. MARE - Out-of-Service (Figs. 2 & 5)

MARE is sent to the CPU under the following conditions :

1) - Photoreader off (MARE 1 from Actuator)
2) - Covers open (MICA1 from Actuator)
3) - Speed Control at A (MIVE from Actuator)
4) - Speed Control at C (MIRI from Actuator)
5) - Tape broken (BARO from Actuator)
6) - No tape (MABA from Actuator)

2.2.3. TESE - End-of-Tape (Figs. 2 & 5)

TESE results from either tape end right (FIDEA) or tape end left (FISIA) signals from the Actuators.

2.2.4. SECO - Manual Mode (Figs. 2 & 5)

SECO results of either the console MANUALE switch (MANU) or out-of-service condition (MARE1). It is reset only by pushing the console AUTOMATICO switch, with MARE1 absent.

2.2.5. MATE - Machine Enabled (Figs. 2 & 5)

MATE results from Actuator signal MATE1 when console switch ON is pressed.

2.3. CONTROL LOGIC

Transfer of commands and data through the Control Unit-CPU interface is achieved through an exchange of Control signals. They are listed in Section 3 and described below.

2.3.1. TU20 - Command Sync (Fig. 5)

TU20 accompanies each command from the CPU.
Combined with VICU and CONU, it gates the command into storage and starts the TE30 generator through SS RIRI.

2.3.2. TE30 - Command Acknowledge (Fig. 4)

RIRI 1 triggers the TE30 generator and at TE30 pulse is sent to the CPU, acknowledging receipt of a command.

2.3.3. TE20 - Character Sync (fig. 4)

A TE20 pulse precedes each character transfer from the Control Unit buffer to the CPU. Sprocket sync signal FACON triggers 3 µsec SS TEBA as each character is loaded into the buffer. Output TEBAN is converted to the TE20 pulse and sent to the CPU. TEBAN is also converted to TEBA 1 and TEBA2. These signals strobe the character into the buffer FF's.

2.3.4. FINU - End of Transfer Command (Fig. 4)

FINU commands the Control Unit to stop sending characters.
FINU sets FF FIUC.FIUCN triggers 1.2 µsec. FF MAFI which resets FF MOTO and stops the tape.
Subsequent logic set FF BAFI, which starts the TE20 last-character logio and also causes a FINE output to the CPU.

2.3.5. FINE - End of Transfer (Figs. 2 & 4)

FINE usually results from the end-of transfer command FINU sent by the CPU. FINU is self-generated by the Control Unit only upon receipt of FIDEA or FISIA from the Acatuator.

1) - Reading forward and tape ends - FIDEA and COAVA form DEFI which sets FF BAFI. BAFI is changed to FINE and BAFIN starts the TE20 generator.

2) - Reverse read and tape ends - FISIA, RINI, and INDIN form SIFI which sets FF BAFI, and causes FINE and TE20.

Note - Signals NULON and DELIN are test signals which as COSON with sprocket sync FACON, trigger the TE20 generator.

2.4. SPECIAL TAPE DATA INHIBIT

NULON and DELIN (figs. 4 & 5) are service signals used in conjunction with test tapes. Test data is inhibited from transfer to the CPU. NULON or DELIN high removal enable level COSON, from SS TEBA, and no TE20 pulses can be generated. Thus, test data cannot be transferred to the CPU. The tests characters assume the following configurations to indicate the tape-type control position :

	NULL	DELITE
Control in pos. A (ISO-7+1bits)	00000s000	11111s111
Control in pos. B (IBM FRIDEN)	00100s000	01111s111
Control in pos. C (IS06+1 e teleg)	0100s000	1111s111

These codes correspond to the 8 bit OGE format.

Fig. 2 - CPU - Control Unit - Actuator interface diagram actuator

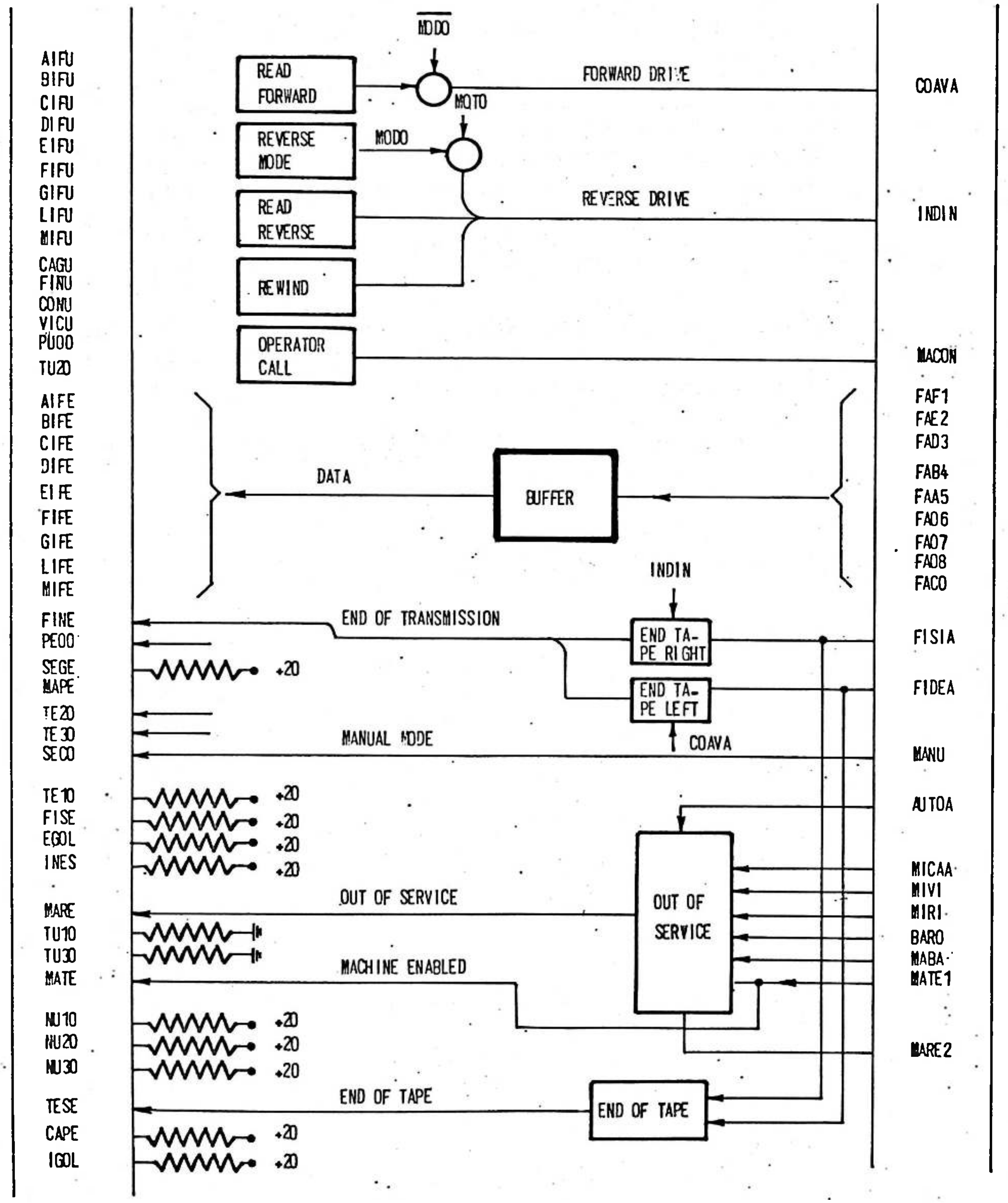


Fig. 3 - Logic Diagram 1/4 - Command Decoder and Reset Gate

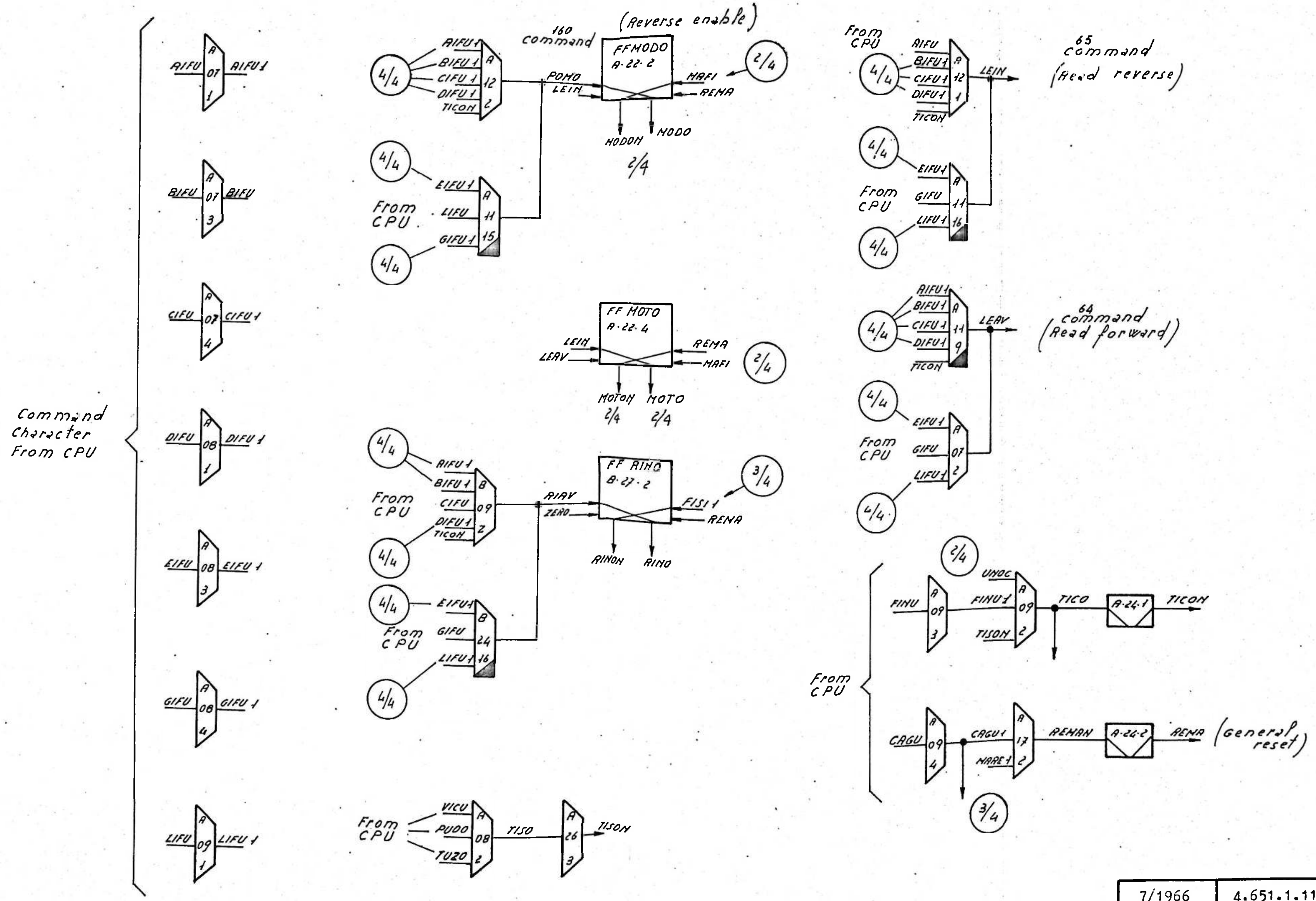


Fig. 4 - Logic Diagram 2/4 - Timing Circuits

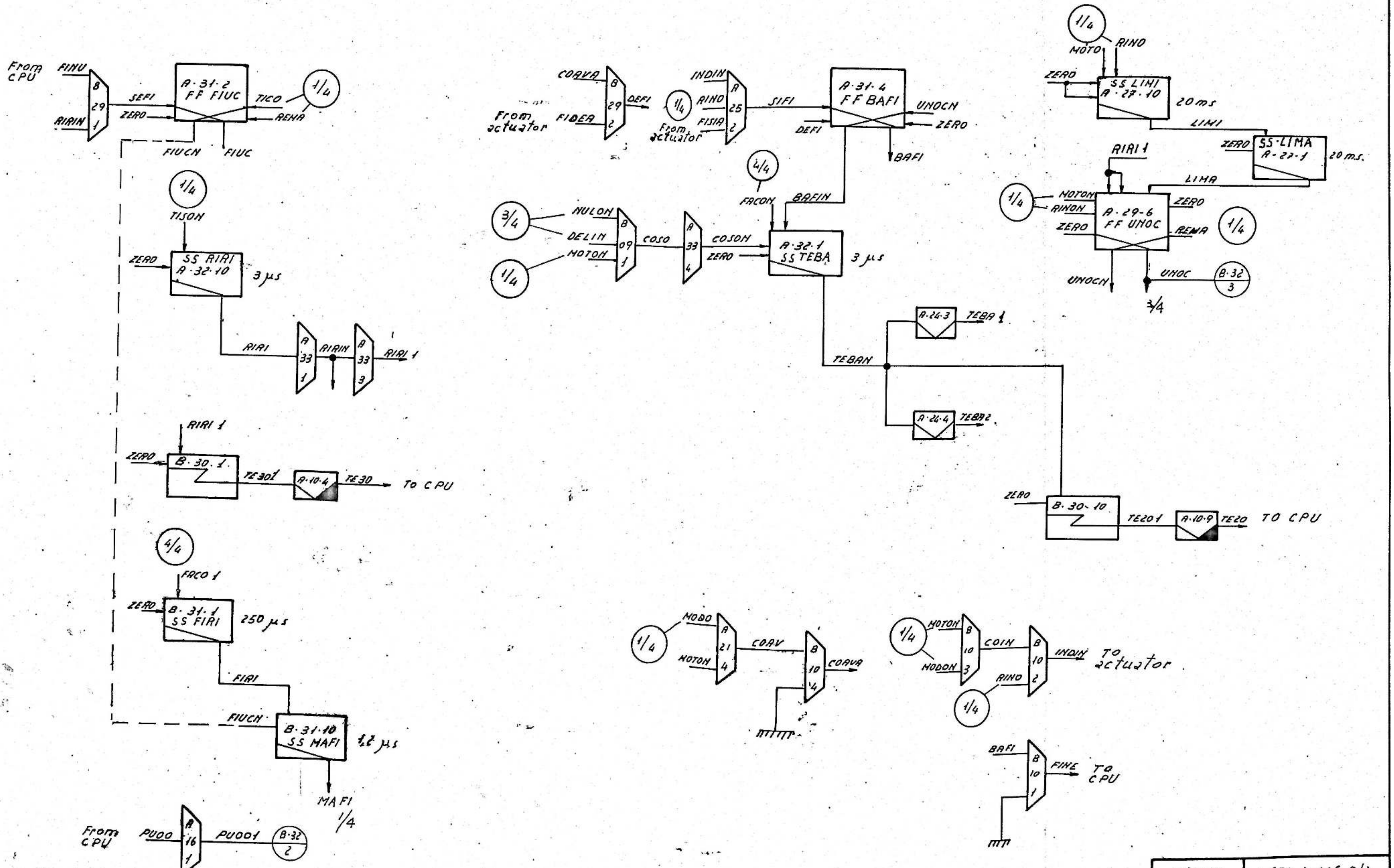


Fig. 5 - Logic Diagram 3/4 - Status Circuits

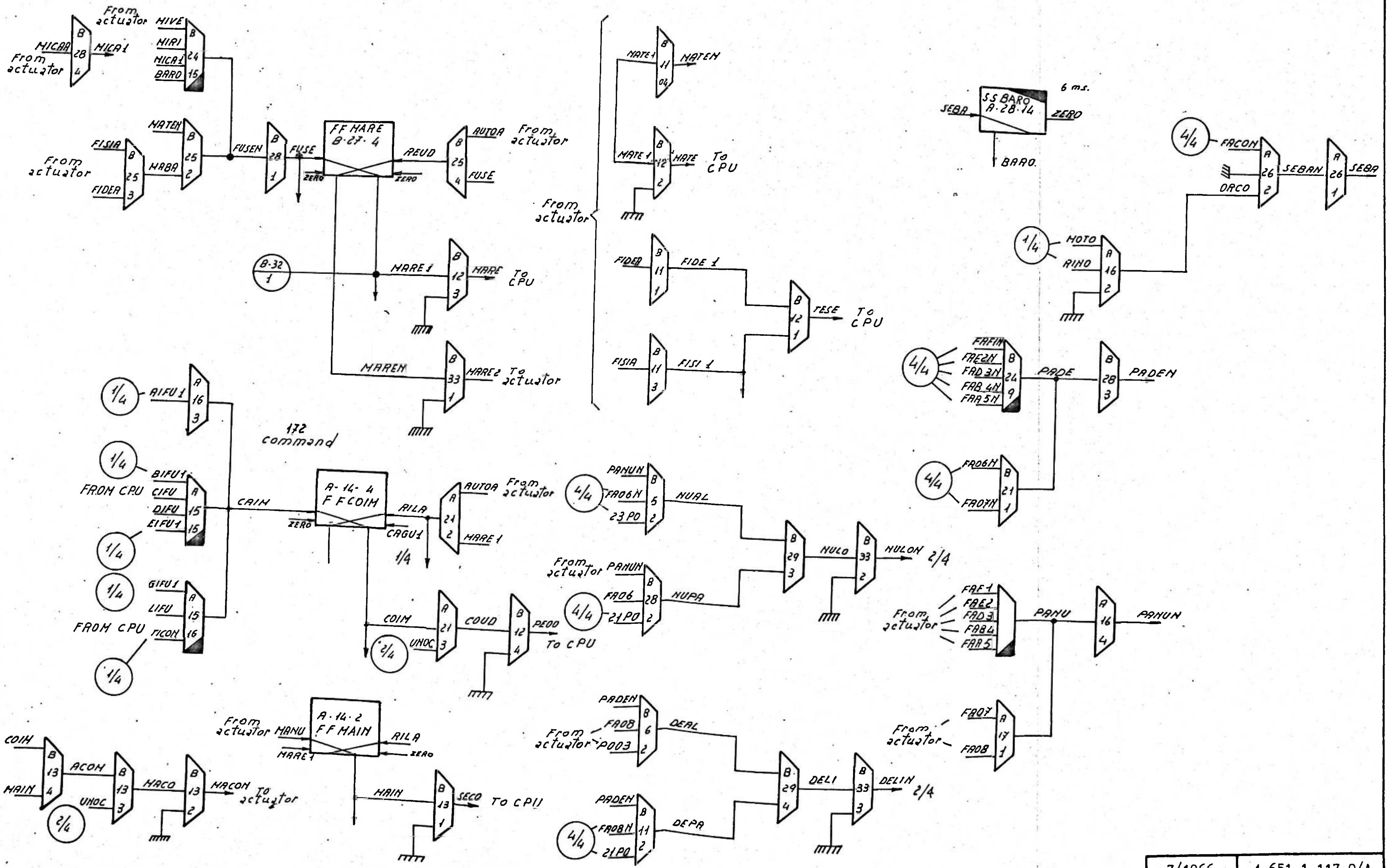
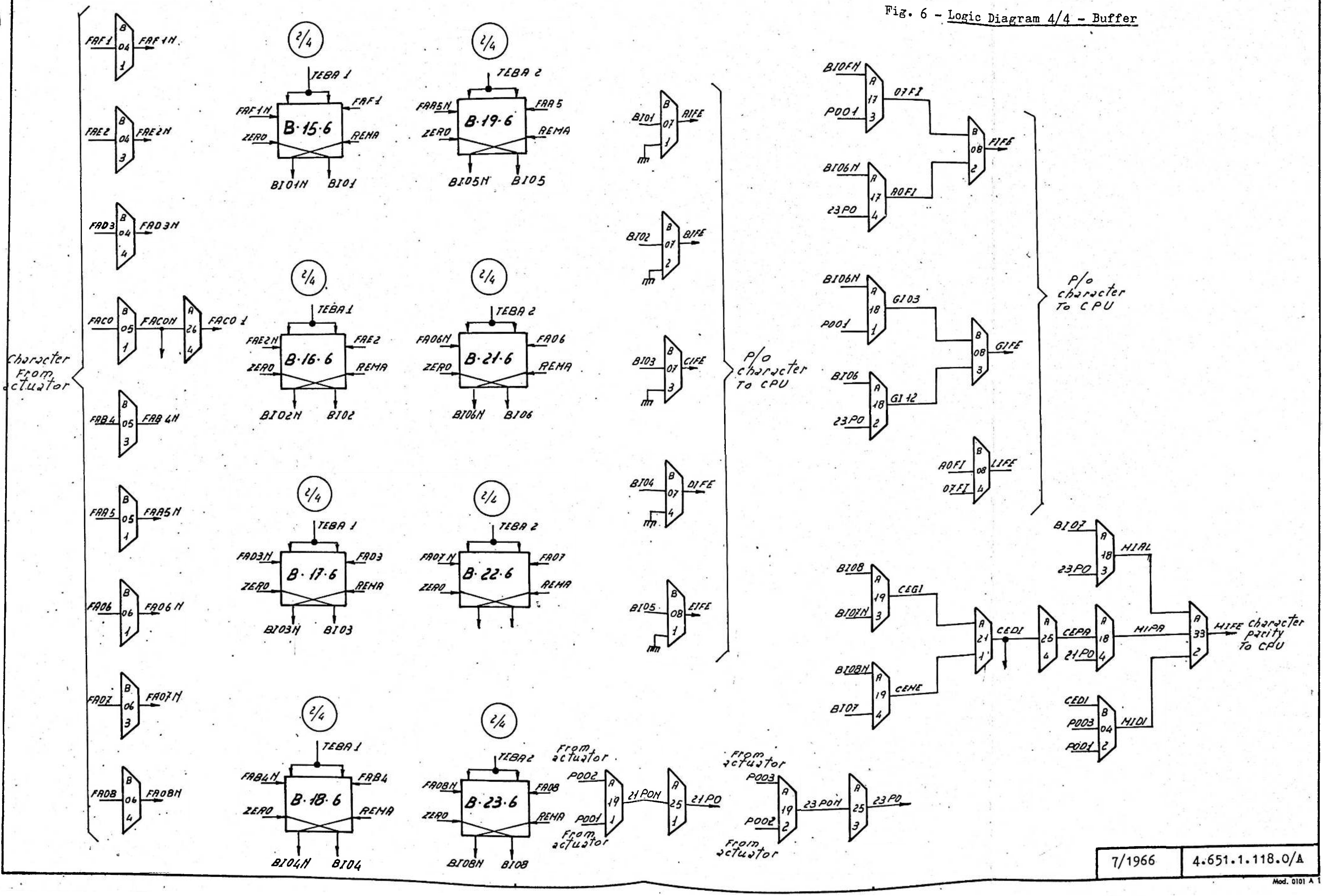


Fig. 6 - Logic Diagram 4/4 - Buffer



3. INFORMATION CODING

Tables 1 through 10 illustrate the interpretation of the five types of tapes and how each appears on the PTR 500 - CPU interface.

Table 1 - ISO code at 7+1 channels from FOT 500
" 2 - ISO code at 7+1 channels to CPU
" 3 - ISO code at 6+1 channels from FOT 500
" 4 - ISO code at 6+1 channels to CPU
" 5 - IBM code from FOT 500
" 6 - IBM code to CPU
" 7 - FRIDEN code from FOT 500
" 8 - FRIDEN code to CPU
" 9 - Telegraph code from FOT 500
" 10 - Telegraph code to CPU

Table 1 – ISO Code at 7+1 Channels from FOT 500

Interpretation of Characters

dcba	gfe 000	001	010	011	100	101	110	111	1000	1001	1010	1011	1100	1101	1110	1111
0000	Null	DLE	Spacc	0	-	P	@	p								
0001	SOH	DC1	!	1	A	Q	a	q								
0010	STX	DC2	"	2	B	R	b	r								
0111	ETX	DC3	#	3	C	S	c	s								
0100	EOT	DC4	CS	4	D	T	d	t								
0101	ENQ	NACK	%	5	E	U	e	u								
0110	ACK	SYNC	&	6	F	V	f	v								
0111	BELL	ETB	'	7	G	W	g	w								
1000	BS	CNCL	(	8	H	X	h	x								
1001	HT	EM	)	9	I	Y	i	y								
1010	LT	SS	*	:	J	Z	j	z								
1011	VT	ESC	+	;	K	[	k	③								
1100	FF	FS	,	<	L	~	l	③								
1101	CR	GS	-	-	M	]	m	③								
1110	SO	RS	.	>	N	^	n	③								
1111	SI	US	/	?	O	`	o	Delete								

Table 2 - ISO Code at 7+1 Channels to CPU

GIB 420 - CPU Interface Format

	lgfe															
dcba	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
0000	Null	DLE			Space	0					-	P			@	p
0001	SOH	DC1			!	1					A	Q			a	q
0010	STX	DC2			"	2					B	R			b	r
0011	ETX	DC3			#	3					C	S			c	s
0100	EOT	DC4			CS	4					D	T			d	t
0101	ENQ	NACK			%	5					E	U			e	u
0110	ACK	SYNC			&	6					F	V			f	v
0111	Bell	ETB			'	7					G	W			g	w
1000	BS	CNCL			(	8					H	X			h	x
1001	HT	EM			)	9					I	Y			i	y
1010	LT	SS			*	:					J	Z			j	z
1011	VT	ESC			+	;					K	[			k	③
1100	FF	FS			,	<					L	~			l	③
1101	CR	GS			-	=					M	]			m	③
1110	SO	RS			.	>					N	^			n	③
1111	SI	US			/	?					O	`			o	Del.

Table 3 – ISO Code at 6+1 Channel from FOT 500

Interpretation of Characters

dcba \ fe	00	01	10	11	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
0000	Space	0	Null	P												
0001	HT	1	A	Q												
0010	LF	2	B	R												
0011	VT	3	C	S												
0100	FF	4	D	T												
0101	CR	5	E	U												
0110	SO	6	F	V												
0111	SI	7	G	W												
1000	(	8	H	X												
1001	)	9	I	Y												
1010		:	J	Z												
1011	+	:	K	④ [												
1100	,	<cs	L	④ \												
1101	-	= %	M	④]												
1110	.	> &	N	Esc.												
1111	/	? '	O	Del.												

Table 4 - ISO Code at 6+1 Channels to CPU

GIB 420 - CPU Format

dcba \ lgfe	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
0000					Space	0					Null	P				
0001					HT	1					A	Q				
0010					LF	2					B	R				
0011					VT	3					C	S				
0100					FF	4					D	T				
0101					CR	5					E	U				
0110					SO	6					F	V				
0111					SI	7					G	W				
1000					(	8					H	X				
1001					)	9					I	Y				
1010					*	:					J	Z				
1011					+	;					K	④ [				
1100					,	< cs					L	④ \				
1101					-	= %					M	④]				
1110					.	> &					N	Esc.				
1111					/	? '					O .	Del.				

Table 5 – IBM Code from FOT 500

Interpretation of Characters

gfe dcba	000	001	010	011	100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
0000	Space	0	-	&	EOL											
0001	1	/	J	A												
0010	2	S	K	B												
0011	3	T	L	C												
0100	4	U	M	D												
0101	5	V	N	E												
0110	6	W	O	F												
0111	7	X	P	G												
1000	8	Y	Q	H												
1001	9	Z	R	I												
1010	PI 1	PI 3	PI 2	SP1												
1011	#	,	$	.												
1100	@	%	*	¤												
1101	PI7	PI4	PI 6	PI5												
1110	EC1	SKIP	CR	SP2												
1111	COR	EC2	ERR	TF												

Table 6 - IBM Code to CPU

GIB 420 - CPU Format

lgfe dcba	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
0000	EOL	Space			0						-					&
0001	1					/						J			A	
0010	2					S						K			B	
0011		3			T						L					C
0100	4					U						M			D	
0101		5			V						N					E
0110		6			W						O					F
0111	7					X						P			G	
1000	8					Y						Q			H	
1001		9			Z						R					I
1010		PI1			PI3		.				PI2					SP1
1011	#											$				
1100		@			%						*					¤
1101	PI7					PI4						PI6			PI5	
1110	EC1					SKIP						CR			SP2	
1111		COR			EC2						ERR					TF

Table 7 – FRIDEN Code from FOT 500

Interpretation of Characters

gfe dcba	000	001	010	011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
0000	Space	0 /)	- / .	& / ;	Carr return											
0001	1 / ,	' / :	j	A												
0010	2 / @	S	K	B												
0011	3	T	L	C												
0100	4 / =	U	M	D												
0101	5 / %	V	N	E												
0110	6 / ¢	W	O	F												
0111	7 / ?	X	P	G												
1000	8 / *	Y	Q	H												
1001	9 / (	Z	R	I												
1010	2 - 8 Space	2 - 8 .0	2 - 8 hyphen	Lower case shift												
1011	Stop code	. / ,	$ / -	. / .												
1100	NP	PR	ON 1 ON 2	Upper case shift												
1101	1-4-8	5-2	9-N	N-2												
1110		Tab														
1111		Punch off	Error	Tape Freed												

Table 8 – FRIDEN Code to CPU

GIB 420 – CPU Format

dcba \ gfe	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
0000	Carr. retun				0 /)						- / ..					& / :
0001	1 / !					' / :						J			A	
0010	2 / @					S						K			B	
0011		3 / #			T						L					C
0100	4 / -					U						M			D	
0101		5 / %			V						N					E
0110		6			W						O					F.
0111	7 / ?					X						P			G	
1000	8 / *					Y						Q			H	
1001		9 / (			Z						R					I
1010		2-8 Space			2-8 0						2-8 hyphem					Lower case shift
1011	Stop code					' / ,						$ / -			. / .	
1100		NP			PR						ON1 ON2					Upper case shift
1101	1-4-8					5-2						9-N			N-Z	
1110						Tab										
1111					Punch off						ERR					Tape feed

Table 9 – Telegraph Code from FOT 500

Interpretation of Characters

dcba	0	1	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
0000	NC	3/E														
0001	5/T	Z														
0010	CR	D														
0011	9/O	B														
0100	SP	S														
0101	H	6/Y														
0110	N	F														
0111	M	X														
1000	LF	A														
1001	L	2/W														
1010	4/R	J														
1011	G	FIGS														
1100	8/I	7/U														
1101	0/P	1/Q														
1110	C	K														
1111	V	LTRS														

Table 10 - Telegraph Code to CPU

GIB 420 - CPU Format

lgfe dcba	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
0000					NC	5/T										
0001					3/E	Z										
0010					LF	L										
0011					A	2/W										
0100					SP	H										
0101					S	6/Y										
0110					8/I	0/P										
0111					>/U	1/Q										
1000					CR	9/O										
1001					D	B										
1010					4/R	G										
1011					J	FIGS										
1100					N	M										
1101					F	X										
1110					C	V										
1111					K	LTRS										

4. INTERCONNECTIONS

Table 11

CONTROLLER		INTERFACE			ACTUATOR	
Row B		SIGNAL			Row B	
CON.	PIN	NAME	FUNCTION	NAME	PIN	CON.
01	01	AUTOA	"0" = Automatic Mode ←		04	01
01	02	MICAA	µSW "0" = Cover open ←		04	02
01	03	FISIA	µSW "0" = End Tape Left ←		04	03
01	04	FIDEA	µSW "0" = End Tape Right ←		04	04
01	05				04	05
01	06	COAVA	"0" = Tape Forward →		04	06
01	07	INDIN	"0" = Tape Reverse →		04	07
01	08				04	08
01	09	MIRI	µSW "1" = Speed Selector at 775 c/s		04	09
01	10	MIVE	µSW "1" = Speed Selector at 250 c/s		04	10
01	11				04	11
01	12	P002	"1" = IBM & FRIDEN ←		04	12
01	13	MATE1	"1" = Photoreader off ←		04	13
01	14				04	14
01	15	MANU	Manual Mode ←		04	15
01	16	P003	"1" = ISO 7+1 Code ←		04	16
01	17	ZERO			04	17
02	01	FAF1	Read Bit from Track F ←		05	01
02	02	FAE2	" " " " E ←		05	02
02	03	FAD3	" " " " D ←		05	03
02	04	FACO	" " " " Sync ←		05	04
02	05				05	05
02	06	FAB4	" " " " B ←		05	06
02	07	FAA5	" " " " A ←		05	07
02	08				05	08
02	09	FA06	" " " " G ←		05	09
02	10	FA07	" " " " H ←		05	10
02	11				05	11
02	12	FA08	" " " " L		05	12
02	13	MARE2	Out of Service ←		05	13
02	14				05	14
02	15	P001	"1" = ISO 6+1 Code		05	15
02	16	MACON	"0" = Operator Call		05	16
02	17				05	17

Table 12

SYNC UNIT			INTERFACE	CONTROLLER		
		SIGNAL			Row A	
		NAME	FUNCTION	NAME	PIN	CON.
			Input Bit A →	AIFU	01	01
			" " B →	BIFU	01	02
			" " C →	CIFU	01	03
			" " D →	DIFU	01	04
					01	05
			" " E →	EIFU	01	06
			" " F →	FIFU	01	07
					01	08
			" " G →	GIFU	01	09
			" " L →	LIFU	01	10
					01	11
			" " M →	MIFU	01	12
			Not Used ←	TE10	01	13
					01	14
			Command Sync →	TJ20	01	15
			Command Received ←	TE30	01	16
				ZERO	01	17
			Output Bit A ←	AIFE	02	01
			" " B ←	BIFE	02	02
			" " C ←	CIFE	02	03
			" " D ←	DIFE	02	04
					02	05
			" " E ←	EIFE	02	06
			" " F ←	FIFE	02	07
					02	08
			" " G ←	GIFE	02	09
			" " L ←	LIFE	02	10
					02	11
			" " M ←	MIFE	02	12
			Not Used →	TU10	02	13
					02	14
			Character Sync ←	TE20	02	15
			Not Used →	TU30	02	16
				ZERO	02	17

Table 13

SYNC UNIT		INTERFACE			CONTROLLER	
		SIGNAL			Row A	
		NAME	FUNCTION	NAME.	PIN	CON.
			General Reset →	CAGU	03	01
			End Transfer →	FINU	03	02
			Interrupt Served →	CONU	03	03
			Command Identily →	VICU	03	04
					03	05
			End of Transfer ←	FINE	03	06
			Control Unit Available ←	PEOO	03	07
					03	08
			Not used (+20Vdc) ←	SEGE	03	09
			Not used (+20Vdc) ←	FISE	03	10
					03	11
			Manual Mode ←	SECO	03	12
			Not used (+20Vdc)	EGOL	03	13
					03	14
					03	15
					03	16
				ZERO	03	17
			Unit Selection Level →	PUOO	04	01
			Not Used	MAPE	04	02
			End of Tape ←	TESE	04	03
			Out of Service ←	MARE	04	04
					04	05
			Machine Enabled ←	MATE	04	06
			Not Used (+20Vdc) ←	INES	04	07
					04	08
			Not Used (+20Vdc) ←	CAPE	04	09
					04	10
					04	11
			" " (+20Vdc) ←	IGOL	04	12
			" " (+20Vdc) ←	NU10	04	13
					04	14
			" " (+20Vdc) ←	NU20	04	15
			" " (+20Vdc) ←	NU30	04	16
				ZERO	04	17

INSTALLATION

GENERAL ELECTRIC
GENERAL ELECTRIC INFORMATION SYSTEMS ITALIA

PAPER TAPE READER SUBSYSTEM

(PTR 100 - PTR 101)

Installation

A Field Engineering
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1. INTRODUCTION

The purpose of this manual is to furnish a sequence of operations to optimize the installation of a PTR 100-101 Paper Tape Reader subsystem.

These operations presume that the site has been adequately prepared in accordance with the requirements quoted in the "Site Preparation" manual but do not directly consider the actual configuration of the Paper Tape Reader subsystem.

The installation team will draw all the necessary informations from the following two auxiliary documents, individual to each installation:

- Site layout -
  Giving the collocation of the subsystem in the site and showing those accessories which, though not normally supplied with the subsystems, are necessary to overcome particular space or operative problems (i.e. extra low level cable ducts, cable ways and so on).
- Unified Subsystems Connections -
  The forms bearing the above name, give information upon the connection of the subsystems to:
  - the CPU or MPA connectors,
  - the centralized DC power supply,
  - the AC supply breakers,
  - the fan supply and their protections.

The Unified Subsystems Connections (USC) forms also give details on the insertion of plugs and terminators.
A detailed description on how to use the USC forms, will be found in the CPU Installation Manual P.N. 4.625.0.000. /A.

All the materials necessary for the mechanical and electrical assembly are listed in the subsystem "Cables and Parts List" under voice Parts Description, Kit 1.

The final subsystem check-out must only be carried out if the structural and electrical connections have been completed and if the Central Processor and program loading subsystem check-out has been fulfilled.

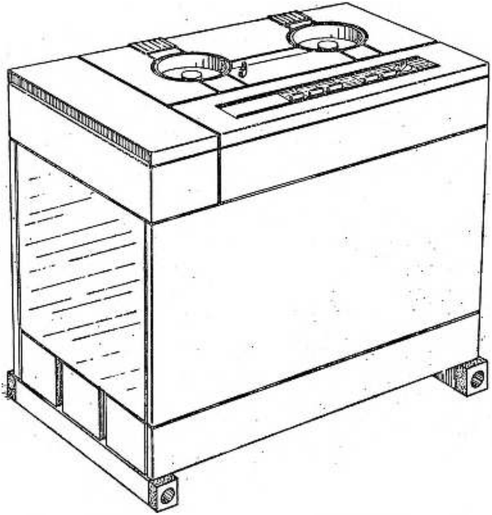


Fig. 1.1. - FOT 400/500 paper tape reader subsystem (PTR 100 - 101)

2. TOOLS AND INSTRUMENTS

The operations to be performed to install a Paper Tape Reader subsystem may be carried out with the use of the following equipment:

- engineer's tool kit,
- site tools,
- Bushing type pliers (P.N. 4355406 G).

3. ACCEPTANCE AND COLLOCATION

3.1. – PACKING

The subsystem is normally shipped to its destination in a single container together with the pertinent documentation and accessories.

External to the packing crate, are affixed two forms giving:
- the contents of the crate,
- the guide to uncrate and remove from the pallet (*).

(*) Wooden battened transport base.

3.2. – ACCEPTANCE

Upon receipt, all packages are to be visually examined for damage. If any damage is noticed, it will be necessary to:
- have the carrier witness the entity of the damage,
- submit a detailed report to Headquarters.

3.3. – UNCRATING

- Ensure that the subsystem is uncrated as per rules set out by the uncrating guide attached to the outside of the crate.
- Ensure that the contents tally with the description.
- Remove the documents and accessories, contained in the crate, and set them aside.
- Set aside the following kits:
  - Parts Kit P.N. 0646666 R
  - Cables Kits P.N. 0646664 H or 0646665 D

Note

The two cable kits only differ in as much as their length is concerned.
The longest cable will always be supplied whenever it is difficult to establish the required length.

3.4. – DESKIN AND COLLOCATION

- To ease the lifting of the subsystem from its transport pallet, set it in place as per Site Layout plan and then connect it up both mechanically and electrically, it is opportune to remove all panels as follows:
  - vertically lift the panel upwards to its stop, pull the bottom part outwards and hence remove,
  - place the subsystem as per Site Layout plan.

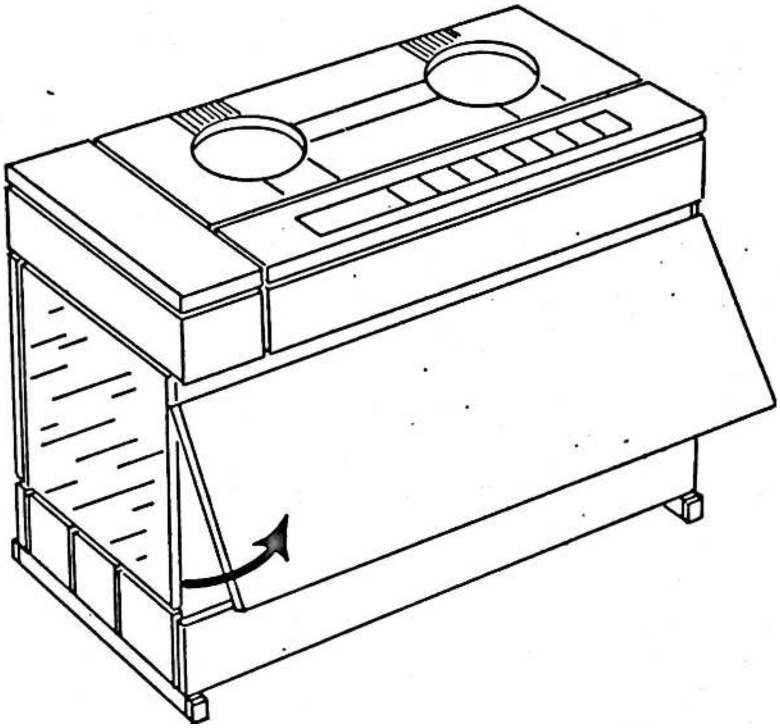


Fig. 3.1. – Front Panel Removal

4. MECHANICAL ASSEMBLY

- Using an 8 mm Allen key, adjust the Paper Tape Reader screw-feet to bring the unit to plumb.

5. CABLE CONNECTIONS

- Unfurl the following cables, see dawg. n° 15043581, laying them in the pertinent channels till they reach their connecting points:
  - . Signal cables C1, C2, C3, C4,
  - . A.C. and fan supply cable C7,
  - . D.C. supply cables C5, C6.
- To establish each individual cable connecting point, consult the symbolic markings on the cables themselves and refer to the Unified Subsystems Connections (USC) forms.

Note

If difficulties arise in the interpretation of the markings, or should the cable markings actually be missing, refer to Dwg. No. 15023516.

- After having taken into account the various cable path bends, take up all excess cables and fit them in the lowest reader compartment.
- After having inserted the cable connectors, clamp the cables securely along their path.
- Insert terminator PWB TAPO B, drawn from the pertinent Parts Kit, as per USC forms.
- Connect up the D.C. supply cables.
- Insert the A.C. supply cable, C7, in the pertinent ALI 260 side hole.
- Connect up the breaker, drawn from the Parts Kit.
- Secure the breaker to its mounting.
- Pull the cable toward the outside and secure it with the bushing clamps , using the special pliers. See fig. 5.1.
- For subsystem connections and cable layout, refer to dwg. n° 15042010. (External covers and cables).

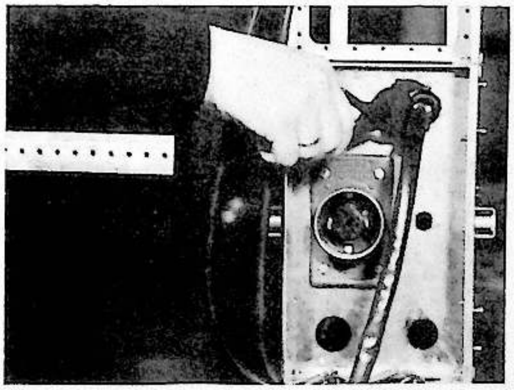


Fig. 5.1. –
Use of the Bushing pliers

6. VISUAL CHECKS

When all cable connections have been done, it is indispensable to carry out an accurate visual check to:

- The correctness of the mechanical assembly.
- The tightness of all nuts and bolts.
- The wire-wraps for no bent pins, loose wraps, broken wires or shorts.
- The proper insertion of all boards, cable connectors and plugs.

7. CHECK - OUT

7.1. - OFF LINE CHECKS

The operations described are to be done after the mechanical assemblies have been completed and the electrical connections of the whole system have been done.

- Manually turn the motor pulley. No abnormal noise must be heard or hard spots experienced.
- Set to ON the Paper Tape Reader subsystem breaker.
- Check that lamps OFF and ALERT are lit.
- Check that the fans in the electronic module rotate freely.
- Load a tape on the plates.
- Depress pushbutton STAND BY.
  Subsequent pressures on START, must cause the tape to first start in one direction then go in the opposite one.
- Repeat above operations after having changed speed. First position the knob opposite the 3 dots then opposite the 2 dots.
- Depressing OPERATE all luminous indicators must extinguish.

7.2. - ON LINE CHECKS

The checks hereby listed are only to be done after the final check-out of the Central Processor and of the program loading subsystem are complete,

- Ensure that the diagnostics with the subsystem correspond to the P.N. and description given in the "Product Composition Sheet".
- Feed through the pertinent diagnostics adherings to the rules given in each diagnostic description.
- If a particular diagnostic program gives rise to an error halt, do not start looking for a fault, but follow this procedure:
  - a - Check the correct punching of the "Site Composition Card" by referring to the "Diagnostic Organization". Manual.
  - b - Check the correctness of sequence of the card deck and its perforations with the Control Program.
- If none of these checks give rise to doubt on the accuracy of the diagnostic, proceede to troubleshoot the fault.

8. FINAL OPERATIONS

8.1. - SKIN UP

- Set the ALI 260 main breaker to OFF.
- Check that the machine type and serial numbers on the yellow label correspond to the description given in the "Product Composition Sheet".
- Replace all panels and covers removed prior to starting the installation.

8.2. - CHECKS AFTER HANDOVER TO CUSTOMER

- Check that the drawings and the updating indices of them, shown in the subsystem folder, correspond to those given in the "Product Composition Sheet".
- Transcribe on the "FCO Status Log" the relevant indices.

> NOTE
>
> Those drawings having several sheets with the same drawing number, are shown on the "Product Composition Sheet" with the highest updating index.
> On the other hand, the "FCO Status Log" shows the index of each sheet.

- Check that the tools and equipment supplied, physically corresponds to the packing list or ISL recommended by the Headquarters.
- Prepare a Report giving details of snags or defects found during the installations.

9. WITHDRAWAL

When a subsystem is withdrawn from a site, it must be removed complete of all the cables and parts kits mentioned on dwg. n° 15023516.

9.1. - OPERATIONS

- Remove power from the system.
- Remove all subsystem panels and covers.
- Disconnect all cables and remove the breaker, withholding this material in a packet.

9.2. - GROUPING OF CABLES AND PARTS

- Gather the cables, neatly roll up and fix them with adhesive tape.
- Rigidily fix this bundle of cables within the cabinet so as it will not move during transport.
- Place the packet, containing the breaker and fixing screws, in the cabinet.
- Replace the panels and covers, previously removed, and fix them with adhesive tape.

9.3. - SUBSYSTEM REMOVAL

- Upon withdrawal ascertain that all the changes have been transcribed on the pertinent status log.
- The subsystem must be complete of:
  - . Machine documentation
  - . Description Manual
  - . Diagnostic decks and description
  - . All not yet implemented FCOs

9.4. - SHIPMENT RULES

Check that sufficient care is taken, on behalf of the transport personnel, not to damage the machinery during loading for shipment operations.

9.5. – FINAL OPERATIONS

Fill in the appropriate shipment note and hence return it to the pertinent office.

10. ATTACHED DRAWINGS

To complete the present Installation Manual, the following drawings have been attached:

Name	Drawing n°	Sheet
Cables and parts lists for physical unit connection	15023516.0	
External cables and covers	15042010.3	
Physical block diagram	15043581.0	1 and 2

RIF REF	TIPO TYPE	MARCATURA CAVI / CABLE LABELLING LATO INT ALL' U.F. SIDE INT. TO PH. UNIT	MARCATURA CAVI / CABLE LABELLING LATO EST. ALL' U.F SIDE EXT. TO PH. UNIT	FUNZ. FUNCT.	NOTE NOTES
C1	NS45	GIB410/420 A01	L-PTR-A	LOG.	
C2	NS45	GIB410/420 A02	L-PTR-B	LOG.	
C3	NS45	GIB410/420 A03	L-PTR-C	LOG.	
C4	NS45	GIB410/420 A04	L-PTR-D	LOG.	
C5	AL100	BARRA +20	U-PTR- +20	D.C.	1
C6	AL101	BARRA 0	U-PTR-MASSA	D.C.	2
C7	AL144	CON 300 M3-1	T-PTR-N	A.C.	3
		2	Gr		4
		3	Gr		5
		4	Y		6
		5	Z		7
		6	X		2
C7b	AL32	CON 300 M3-1	PTR P-1	A.C.	3 - 8
		2	2		4
		3	3		1
		4	4		6
		5	5		7
		6	6		2

RIF REF	KIT 1 COD. 0646664 H CODICE CODE	KIT 1 Q	KIT 2 COD. 0646665 D CODICE CODE	KIT 2 Q
C1	0641231 L	4	0641232Y	4
C2				
C3				
C4				
C5	0640397U	1	0640390J	1
C6	0640351P	1	0640327V	1
C7	0640642G	1	0640633B	1
C7b	0641837S	1	0641837S	1

DESCRIZIONE PARTI PARTS DESCRIPTION	KIT 1 COD. 0646666 R CODICE CODE	KIT 1 Q	KIT 2 COD. CODICE CODE	KIT 2 Q	NOTE NOTES
BREAKER TQL32010	0002114E	1			
TAPO B	0615231J	1			

NOTE:
NOTES

1) Colore giallo (Yellow)
2) Colore nero (Black)
3) Colore bianco (White)
4) Colore verde (Green)
5) Colore marrone (Brown)
6) Colore rosso (Red)
7) Colore blu (Blue)
8) Da usare in sostituzione del cavo C7 se prima del FTL c'è installato un altro FTL. Collegarlo alla morsettiera di quest'ultimo. (To be used as replacement of the cable C7 if before the PTR100/101 there is a PTR100/101. Connect it to the terminal box of this last one)

REV				
0		25.6.68		

comp. Semboloni
emiss.
appr.

LISTA CAVI E PARTI PER IL COLLEGAMENTO DI UNITA' FISICHE
CABLES AND PARTS LIST FOR PHYSICAL UNIT CONNECTION

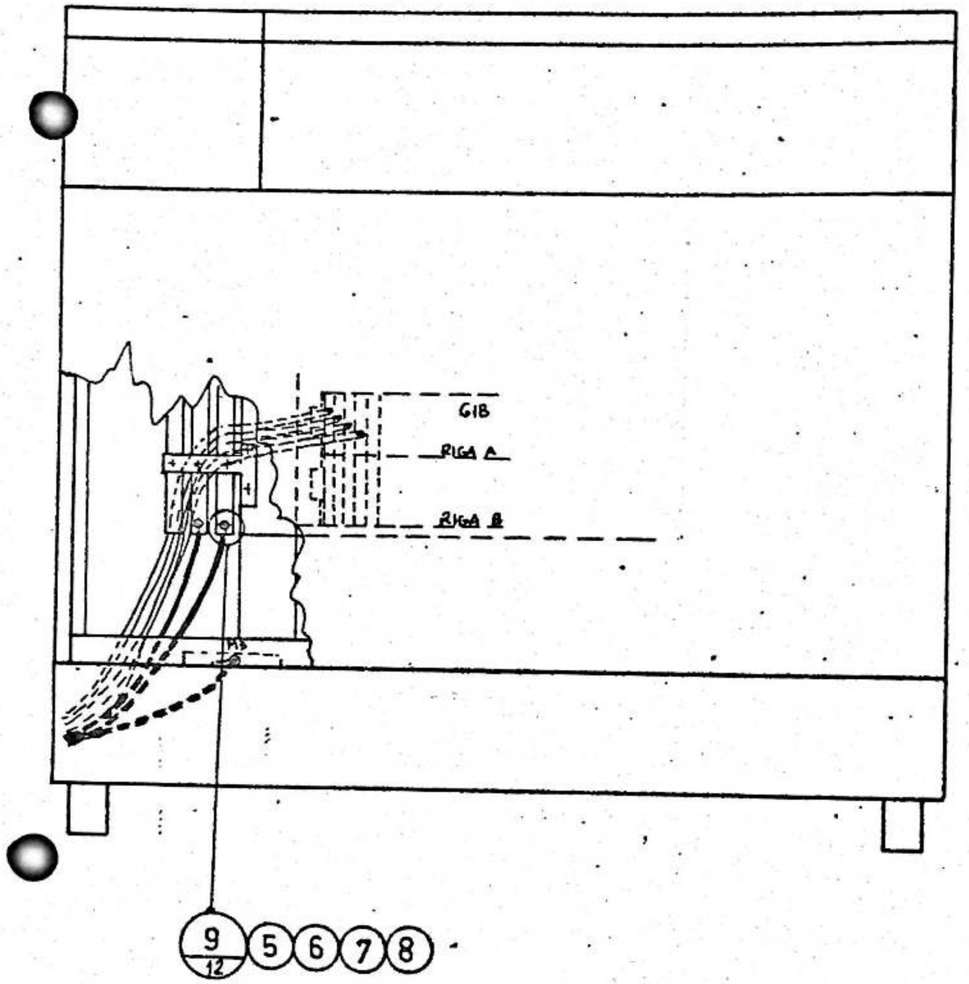
FTL 400 - FTL 500

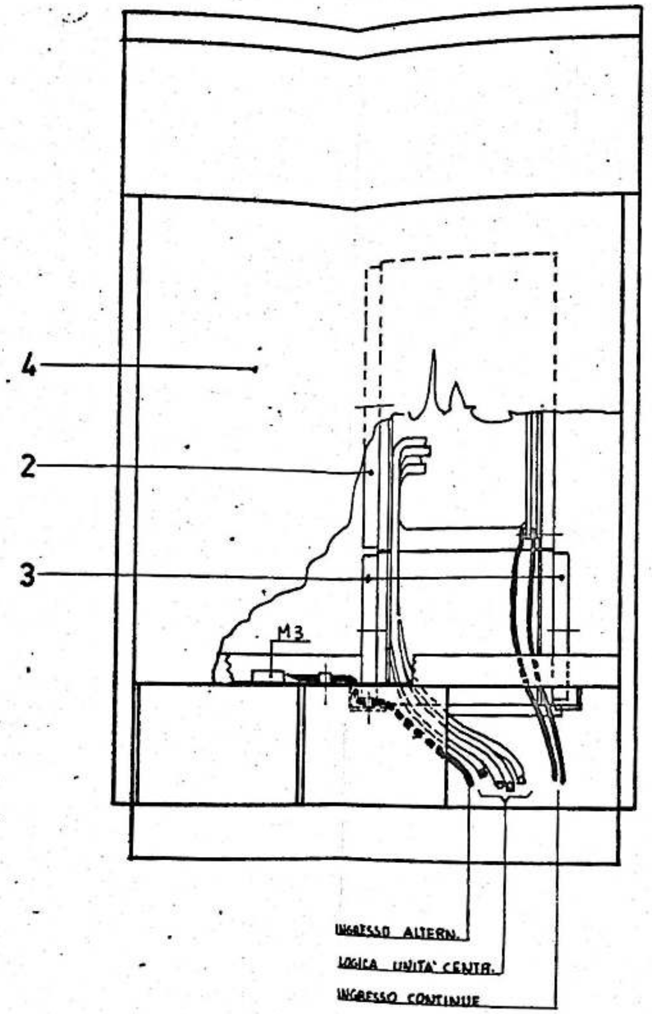
Pappl. PTR100 - PTR 101

GENERAL ELECTRIC

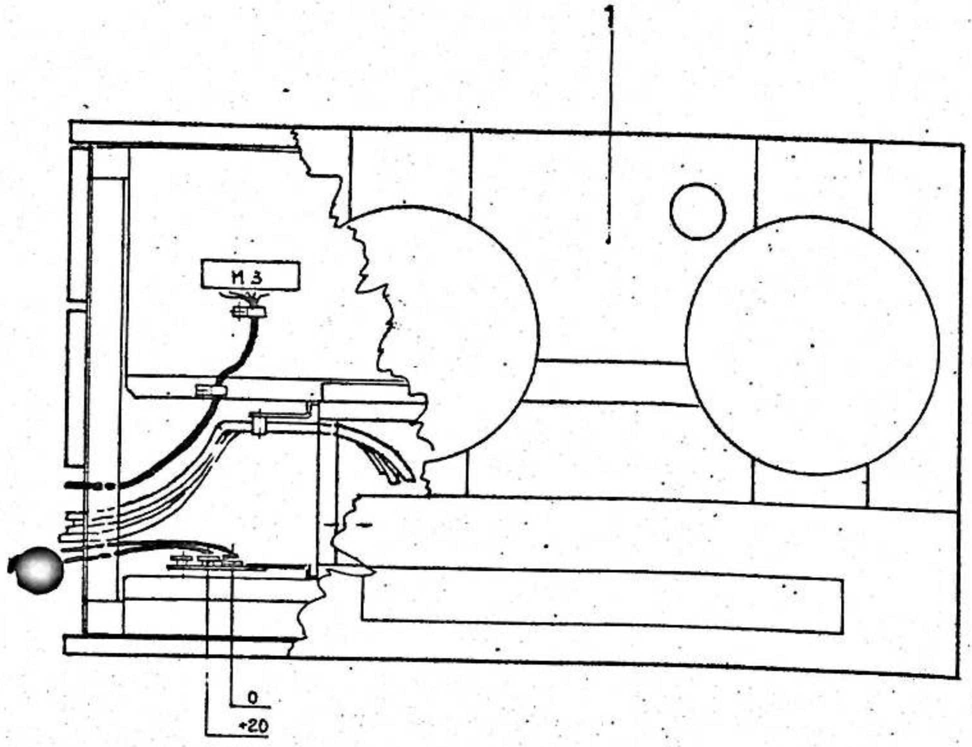
sez.-sec. S.P.S.
loc. PREGNANA M.

Nº 15023516 0
cont. su fo. / fo. 1





POSIZIONE		DENOMINAZIONE		COLORE	NOTE
GIB 410/420	A01	CONNETTORE	A		A UNITA' CENTRALE CANALE STANDARD
" "	A02	"	B		
" "	A03	"	C		
" "	A04	"	D		
ATA 020	BARRA 0	MASSA		NERO	ALIMENT. CONT. A SISTEMA
"	" +20	TENSIONE +20		GIALLO	
CON 300	M3-1	NEUTRO		BIANCO	ALIMENT. ALTERN. A SISTEMA
"	" -2	TERRA		VERDE	
"	" -3	SCHERMO		MARRONE	
"	" -4	FASE		ROSSO	
"	" -5	FASE		BLU	
"	" -6	FASE		NERO	



npm	SIMB.	DESCRIZIONE	CODICE B	CODICE A	DISEGNO
/	/	DISTINTA DI COMPLETAMENTO		0646128 U	
1	/	KIT PARTI DI SOTTOSISTEMA	~~IN ALTERNAT.~~	0646666 R 0646664 M	15023 516 15023 516
1	/	KIT CAVI DI SOTTOSISTEMA		0646665 D	15023 516
1	/	TABELLA VERSIONI			15023 080
/	9	PARTICOLARE 12			01804 094 o
2	8	RONDELLA DENTELLATA ⌀ 8,4 BR		0683131 E	
4	7	RONDELLA PIANA ⌀ 8,4 ott.		0682660 L	
2	6	DADO ESAGONALE M 8 x 1,25 ott.		0682481 V	
2	5	VITE T.E. M 8 x 1,25 x 20 ott.		6314145 N	
/	4	CON 301	~~0645386 Ø~~		
2	3	COPERCHIO 1/2 M VENTILATORE	~~0836292 F~~	0836293 B	
1	2	COPERCHIO 1 M STIROPOR	~~0836263 Y~~	0836264 M	
1	1	ALA N -ASSIEME-			15042 009 o

GENERAL ELECTRIC

115 N.L ALA N
SOTTOSISTEMA
FOTOLETTORE 50-60 Hz
COPERTURE E CAVI ESTERNI

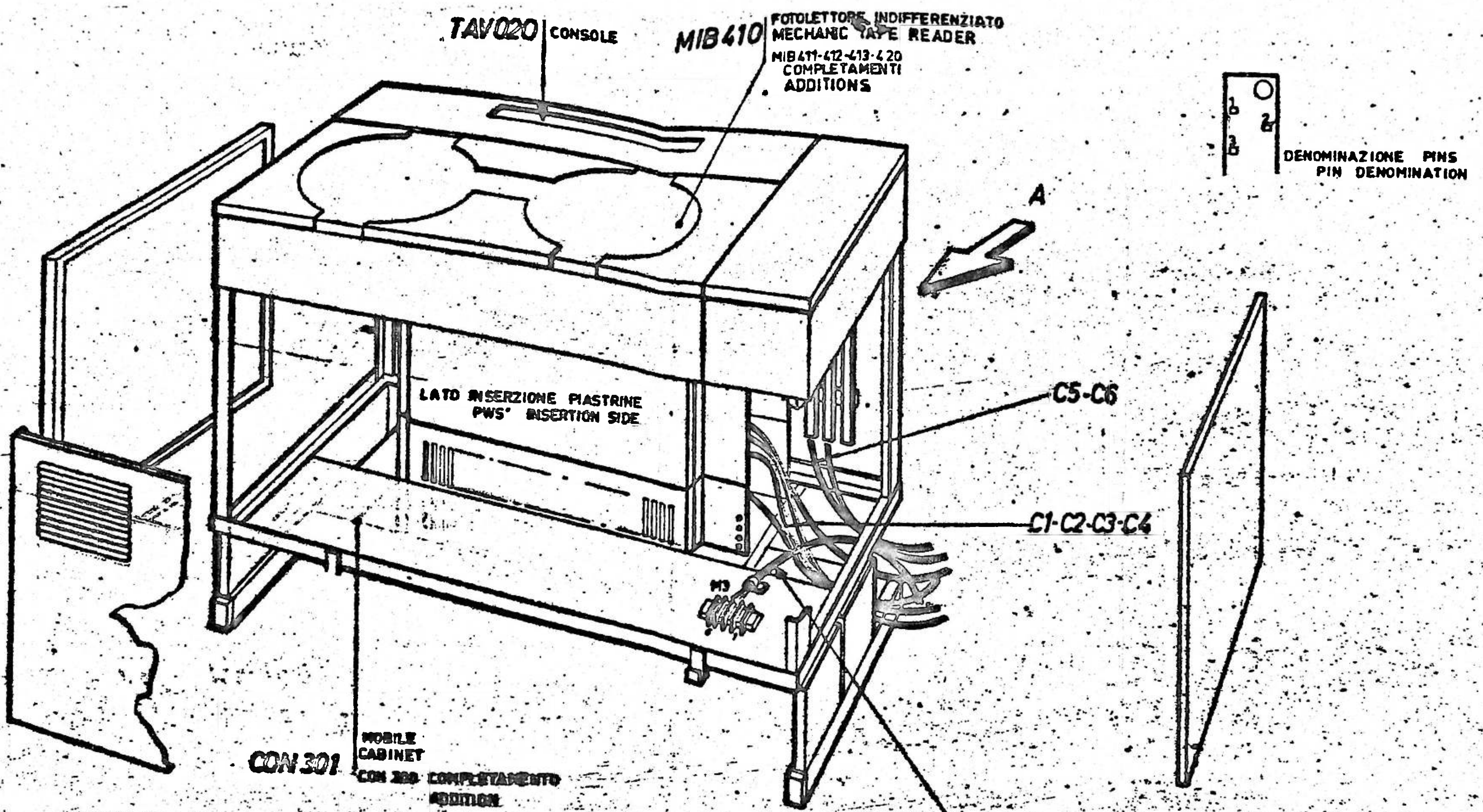
Scala 1:5
Firme Caffelli
ST 20-9-66
TT
FIN:
MAT.

MOD.	DATA	VISTO
DEF	28/9/66	
92591 23829	12.1.67	
MIF.	17-11-67 25.6.68	

~~0048631 G~~
~~0048638 G~~

npm
DISEGNO

N°. DISEGNO 15042010



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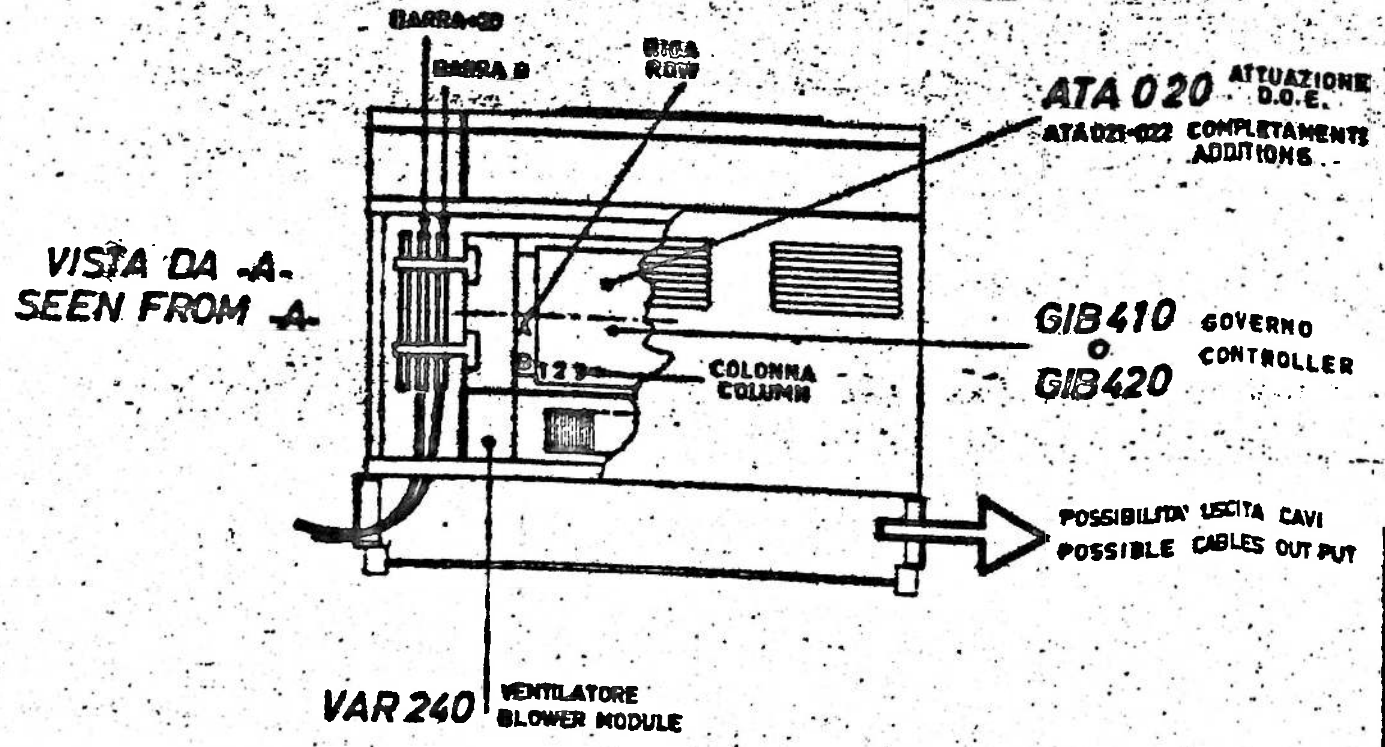

ALA N
WING N

		MOD.	DATA	VISTO	N°. CODICE
GENERAL ELECTRIC	SCHEMA A BLOCCHI FISICO PHYSICAL BLOCK DIAGRAM	68858	19-9-68		
Scala	Firma 9-68 UGGERI				npm / DISEGNO
ST	PTR 100-101				N°. DISEGNO Fo 1(2) 150 43 581 o
MAT.	TT / FIN.				

FIRMA SIGN	IND. ORIG.	GRUPPO-GROUP 01	02	03	04	05	06	ORD.APPL.	REV.	DATA
	/	×						68858	0	19-9-68

COD. ATT UL ATT UL ATT UL ATT UL ATT UL ATT UL SIGLA-NAME

RIF. ITEM.	Nº DIS.-DRAW.No	Nº COD.	DESCR.	QUANTIT. 01	02	03	04	05	06	UM	TD
/	150420100		COPERTURE E CAVI ESTERNI	1							

TIT. SCHEMA A BLOCCHI FISICO PTR 100-101

PHYSICAL BLOCK DIAGRAM

COMP. UCCERI

APPROV.

GENERAL ELECTRIC

STAND.

TP

FOR.

Nº 150 43 581 0

CONT. SU FO. –

FO. 2

Cod. 3894023

MAINTENANCE

GENERAL ELECTRIC
GENERAL ELECTRIC INFORMATION SYSTEMS ITALIA

PAPER TAPE READER SUBSYSTEM

PTR 100 - 101

Maintenance

Second edition

A Field Engineering
publication

4.840.4.001.1/A

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N.B. Remove pages identified with crossed numbers

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1. OPERATOR TASKS

ROUTINE : **1.1**

NAME : GENERAL CLEANING

DURATION : 0.2 h
PREREQUISITES : None

1 - NEEDED MATERIAL

- Brush	P.N. 7110025 V
- Cotton cloth	" 3313100 A
- Alcohol	" 3192250 D

2 - PURPOSE

- Ensure cleanliness of all accessable machine parts.

3 - PRELIMINARY CHECKS

- Ascertain that all power is removed from the subsystem.

4 - PROCEDURE

1) - Brush clean all accessable parts, removing the deposited dust.

2) - Using alcohol dampened cotton cloth, proceed to clean :
   - the read lamp
   - lens
   - read head
   - tape pressure pad
   - tape handler covers and plates

5 - FINAL CHECKS

- None.

2. MAINTENANCE CHECKS

ROUTINE : 2.1

NAME : TAPE DRIVE GROUP CHECK

DURATION : 0.3 h
PREREQUISITES : Routine 5.1.

1 - NEEDED MATERIAL

- Feeler gauge mm	P.N. 7257213 E
- General purpose s/driver	" 7131845 J

2 - PURPOSE

- Check the drive group state of wear.

3 - PRELIMINARY CHECKS

- None.

4 - PROCEDURE

1) - Check that the driven rollers do not present any vertical play, otherwise replace the bearings.

2) - Check that the drive roller clearance results 0.3 mm.
If this requirement is not met, carry out routine 4.5.

3) - Push the driven rollers against their drivers.
Holding a lit lamp behind them, check parallel alignment by ascertaining that the light beam is simultaneously blacked out at the moment of contact, along their entire length.
If this is not the case, implement routine 4.4.

4) - Lift the covers and insert a length of tape between the drive rollers.
Manually near the forward start solenoid armature and check the air gap to be :

0.3 mm for the pole furthest from the rotation axis
0.4 mm for the pole nearest to the rotation axis
} PTR 101 *

* N.B. - These values are merely indicative and may vary on different machines.

0.2 mm for the pole furthest from the rotation axis
0.3 mm for the pole nearest to the rotation axis } PTR 100 *

5) - Carry out the same checks for the reverse start solenoid. If the above requirements are not met, implement routine 4.5.

6) - Close all the covers and check that the brake shoes mate flushly over their entire surface, otherwise carry out routine 4.2.

7) - With the machine in this condition, check the stop solenoid air gap. The pole to armature clearance must result :

0.1 mm for the pole furthest from the rotation axis *
0.15 mm for the pole nearest to the rotation axis *

If the above requirements are not met, implement routine 4.5.

* N.B. - These values are merely indicative and may vary on different machines.

5 - FINAL CHECKS

- None.

ROUTINE : 2.2

NAME : TAPE WIND GROUP CHECK

DURATION : 0.2 h
PREREQUISITES : None

1 - NEEDED MATERIAL

- Check pad jig P.N. 4355270 C

2 - PURPOSE

- Check the group state of wear.

3 - PRELIMINARY CHECKS

- None.

4 - PROCEDURE

1) - Wind tape to a full handler capacity on first one plate and then the other. The tape must result well packed without any vertical shifts.
   In case vertical slips actually arise, press on the plates to detect any shaft end play and, if necessary, replace any defective plate support shaft bearings.

2) - Using the pertinent jig pads, verify the plate to cover parallelism and, if necessary, carry out routine 4.14.

3) - With the speed change in the rewind position, command the machine with several manual bi-directional Start-Stop sequences and check for correct tape movement on the fixed guide, physically located on the extremity of the tape tension arm.
   If the tape is submitted to vertical shifts, carry out routine 4.6.

5 - FINAL CHECKS

- With the subsystem set to block reading, check that the tape tension arms do not intervene violently on the tape but correct the tension in a progressive manner.
  That is to say; when media feeding is halted, the drive reel will still be inclined to unwind some tape, through inertia.
  Between the tape halt and intervention of the plates, which impede further unwinding of the reel, a tape loop will form.
  This loop will almost immediately be taught by the tension arms and plates.
  Should a tape loop not arise, proceed to disassemble the tension arm friction group and check the discs.
  Further-more check the efficiency of the tension arm skids.

ROUTINE : 2.3

NAME : CLUTCH GROUP CHECK

DURATION : 0.2 h
PREREQUISITES : None

1 - NEEDED MATERIAL

- Feeler gauge P.N. 7257213 E

2 - PURPOSE

- Verify the group state of wear.

3 - PRELIMINARY CHECKS

- None.

4 - PROCEDURE

1) - Remove the top central mechanics panel.
2) - Check the main drive belt tension and, if not sufficient, implement routine 4.13.
3) - Lift the covers and check the drive gear to upper clutch disc gap to be $\boxed{0.8 \text{ mm}}$. If the requirement is not met, implement routine 4.11.
4) - Load the machine with a completely wound handler, depress START and, when the covers are closed, check for instantaneous clutch action. Both plates must be imparted with continuous regular rotation.
5) - Repeat step 4, alternately loading the full handler on the two plates. If plate rotation should not result satisfactory, carry out routines 4.11. and 4.13.
6) - Replace the top central panel and check for correct insertion and functioning of the speed change knob.

5 - FINAL CHECKS

- None.

ROUTINE : 2.4
NAME : SPEED CHANGE GROUP CHECK
DURATION : 0.3 h
PREREQUISITES : Routine 5.1.

1 - NEEDED MATERIAL

- None.

2 - PURPOSE

- Verify the group state of wear.

3 - PRELIMINARY CHECKS

- None.

4 - PROCEDURE

1) - Check the 1st, 2nd and rewind speed belts state of wear, and replace if necessary.

2) - Check the main drive belt and, if worn, replace.

3) - Set the speed change knob to the first speed position and check that the pertinent coupling belt is correctly taught.
The other two belts must be loose.
Repeat the above check on both the second and rewind speed belts.

   If the belt tension should not result correct, implement routines 4.8., 4.9. and 4.10.

4) - Check for correct speed change microswitch functioning and, if necessary, carry out routine 4.16.

5 - FINAL CHECKS

- Switch the machine ON and check for correct speed change operation under dynamic conditions (start sequences on all 3 speeds).

ROUTINE : 2.5

NAME : DETECTOR and TENSION ARMS EXCLUSION GROUP CHECK

DURATION : 0.2 h
PREREQUISITES : None

1 - NEEDED MATERIAL

- None.

2 - PURPOSE

- Verify the group state of wear.

3 - PRELIMINARY CHECKS

- None.

4 - PROCEDURE

1) - Open the covers and check that the tape loading operation is not impeeded by the tension arm rollers or fixed guides. Furthermore check that the detector arms are in their max end of travel position, that is, with the metallic extremity against the plate casting rims.
   If this is not the case, implement routine 4.18.

2) - Switch the machine ON and command wind and rewind sequences until the end of tape is reached.
   At this point ascertain that the remaining tape is of sufficient length to permit a successive rewind on the same plate. If the requirement is not satisfied, carry out routine 4.17.

5 - FINAL CHECKS

- None.

ROUTINE : 2.6

NAME : READ SIGNALS SKEW CHECK

DURATION : 0.25 h
PREREQUISITES : Routine 4.21

1 – NEEDED MATERIAL

- Punched tape attached to the diagnostics.
- Scope

2 – PURPOSE

- Check efficiency of the tape drive mechanism.

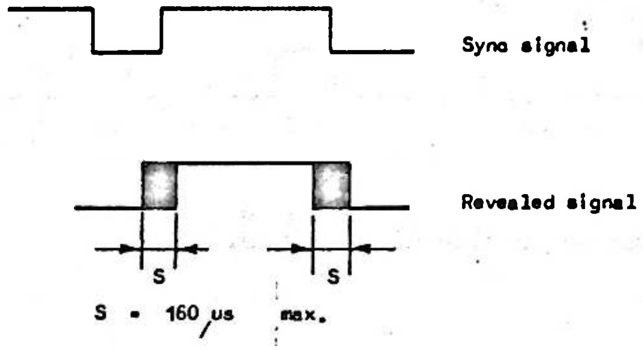
3 – PRELIMINARY CHECKS

- None.

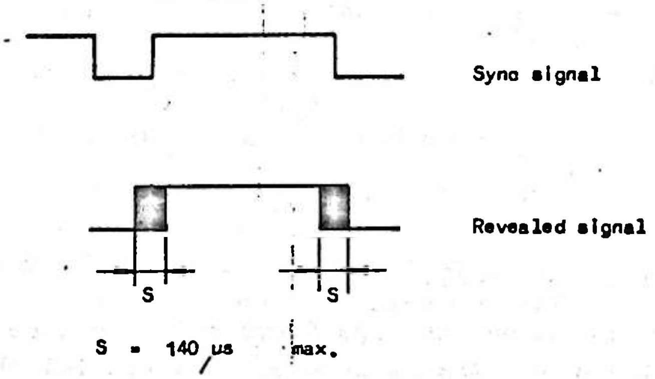
4 – PROCEDURE

1) – Load the punched tape reel.
2) – Set up the scope.
3) – Remove the front panel.
4) – Connect up the sync probe on one of read signals issued by the two extreeme tape tracks.
5) – Check the other extreeme track signal to be as per illustration shown on the following page.

PTR 101



PRT 100



6) - Repeat with scope sync on the other track.
If the skew exceeds the given values, proceed to check the entire tape drive mechanism so as to pin point the part causing an irregular advancement of the tape.

7) - Replace all panels and covers.

5 - FINAL CHECKS

- None.

ROUTINE : 2.7

NAME : READ SIGNAL JITTER CHECK

DURATIONS : 0.25 h
PREREQUISITES : None

1 - NEEDED MATERIAL

- Punched tape attached to the diagnostics.
- Scope.

2 - PURPOSE

- Ascertain that the tape is driven at a constant feed speed.

3 - PRELIMINARY CHECKS

- None.

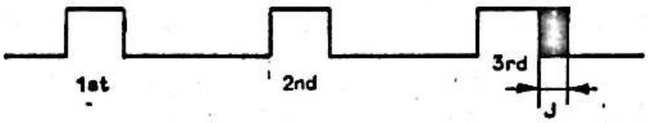
4 - PROCEDURE

1) - Load the punched tape reel.

2) - Connect up the scope on the tape drive hole, in case of a PTR 100 check, or on a central track, in case of a PTR 101 check.

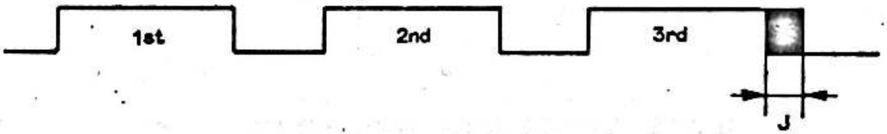
3) - Check that the third signal jitter results as per following illustration.

PTR 100



J = 85 µs max. (on third signal)

PTR 101



J = 160 µs max (on third signal)

4) - Should time J result greater than the specified limit, carry out an accurate check on the entire drive mechanism.

5 - FINAL CHECKS

- None.

3. CLEANING AND LUBRICATION

ROUTINE : 3.1

NAME : CABINET and ELECTRONICS CLEANING

DURATION : 0.3 h
PREREQUISITES : Routine 5.1.

1 - NEEDED MATERIAL

- Brush	P.N.	7110025 V
- Rags	"	3315125 K
- Alcohol	"	3192250 D

2 - PURPOSE

- Maintain the machine as efficient as possible.

3 - PRELIMINARY CHECKS

- None.

4 - PROCEDURE

1) - Remove all panels.

2) - Brush or, if possible, vacuum clean the inside of the cabinet, electronics pack, fan group and both front and rear panels.

3) - Check fan filter efficiency and, if necessary, replace.

4) - Using an alcohol dampened rag, clean the chassis, plates and covers.

5) - Replace the panels previously removed.

5 - FINAL CHECKS

- None.

ROUTINE : 3.2

NAME : CLEANING the MECHANICS

DURATION : 0.3 h

PREREQUISITES : Routine 5.1.

1 - NEEDED MATERIAL

- Cotton cloth	P.N. 3313100 A
- Alcohol	" 3192250 D
- Brush	" 7110025 V
- Petrol	" 3210100 X

2 - PURPOSE

- Maintain the reader as efficient as possible.

3 - PRELIMINARY CHECKS

- None.

4 - PROCEDURE

1) - Using alcohol dampened cotton cloth, clean the read lamp, lens, photodiodes protection glass and tape pressure pad.
During the operation, wrap the cotton on non metallic objects (brush) so as not to damage or scratch the parts being cleaned.

2) - In the same manner proceed to clean the drive rollers, clutch discs, speed change pulleys and belts.
Using petrol dampened cotton cloth, clean the bearings of the speed change shafts.

5 - FINAL CHECKS

- None.

ROUTINE : 3.3

NAME : PHOTOREADER GROUP LUBRICATION

DURATION : 0.5 h
PREREQUISITES : Routine 5.1.

1 - NEEDED MATERIAL

- Medium oil - type ③	P.N. 0491020 G
- Fibrous grease - type $\boxed{2}$	" 0491017 R

2 - PURPOSE

- Maintain the subsystem as efficient as possible.

3 - PRELIMINARY CHECKS

- Ensure that all the parts are perfectly clean, otherwise implement routine 3.2.

4 - PROCEDURE

- Apply 2 or 3 drops of medium oil and a coat of fibrous grease on all those parts indicated in fig. 3.1.

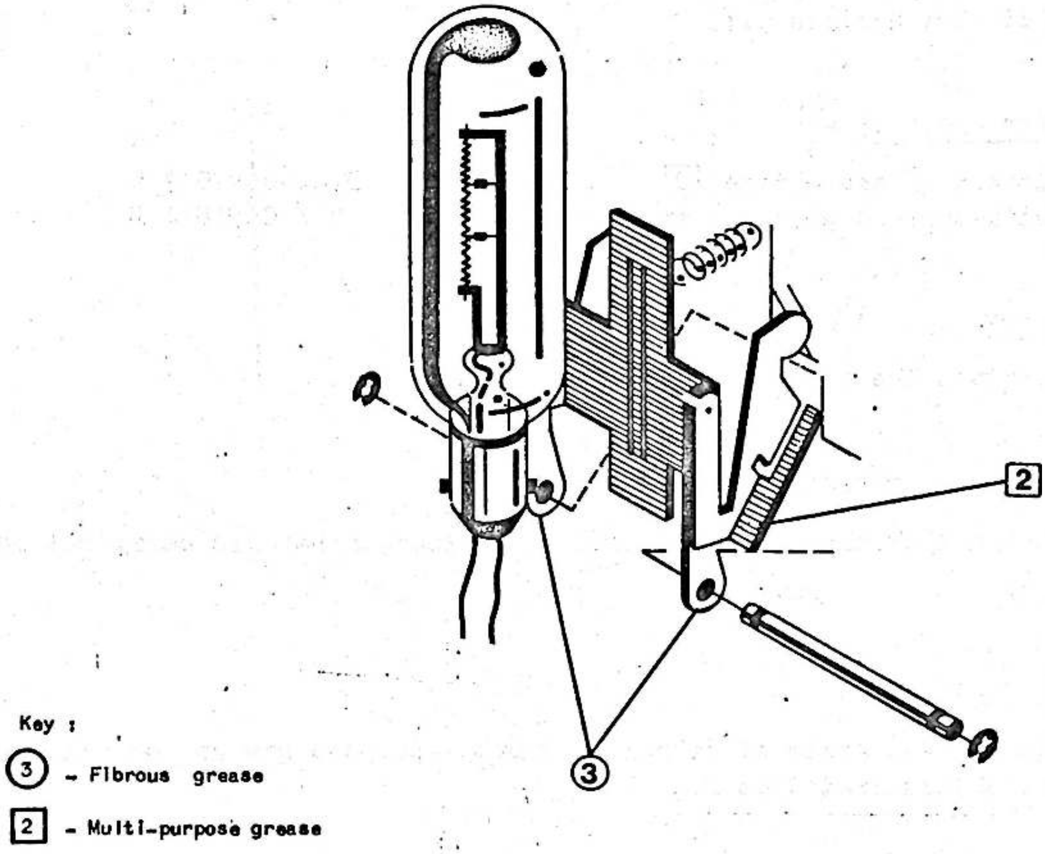


Fig. 3.1. - Photoreader Group

5 - FINAL CHECKS

- None.

ROUTINE : **3.4**

NAME : DRIVE GROUP LUBRICATION

DURATION : 0.1 h
PREREQUISITES : Routine 5.1.

1 – NEEDED MATERIAL

– Fibrous grease – type $\boxed{2}$	P.N. 0491017 R
– Multi-purpose grease – type $\boxed{1}$	" 0491014 D

2 – PURPOSE

– Maintain the reader as efficient as possible.

3 – PRELIMINARY CHECKS

– Ensure that the parts are perfectly clean, otherwise carry out routine 3.2.

4 – PROCEDURE

– Apply light coats of fibrous and multi-purpose grease on all those parts illustrated in fig. 3.2.

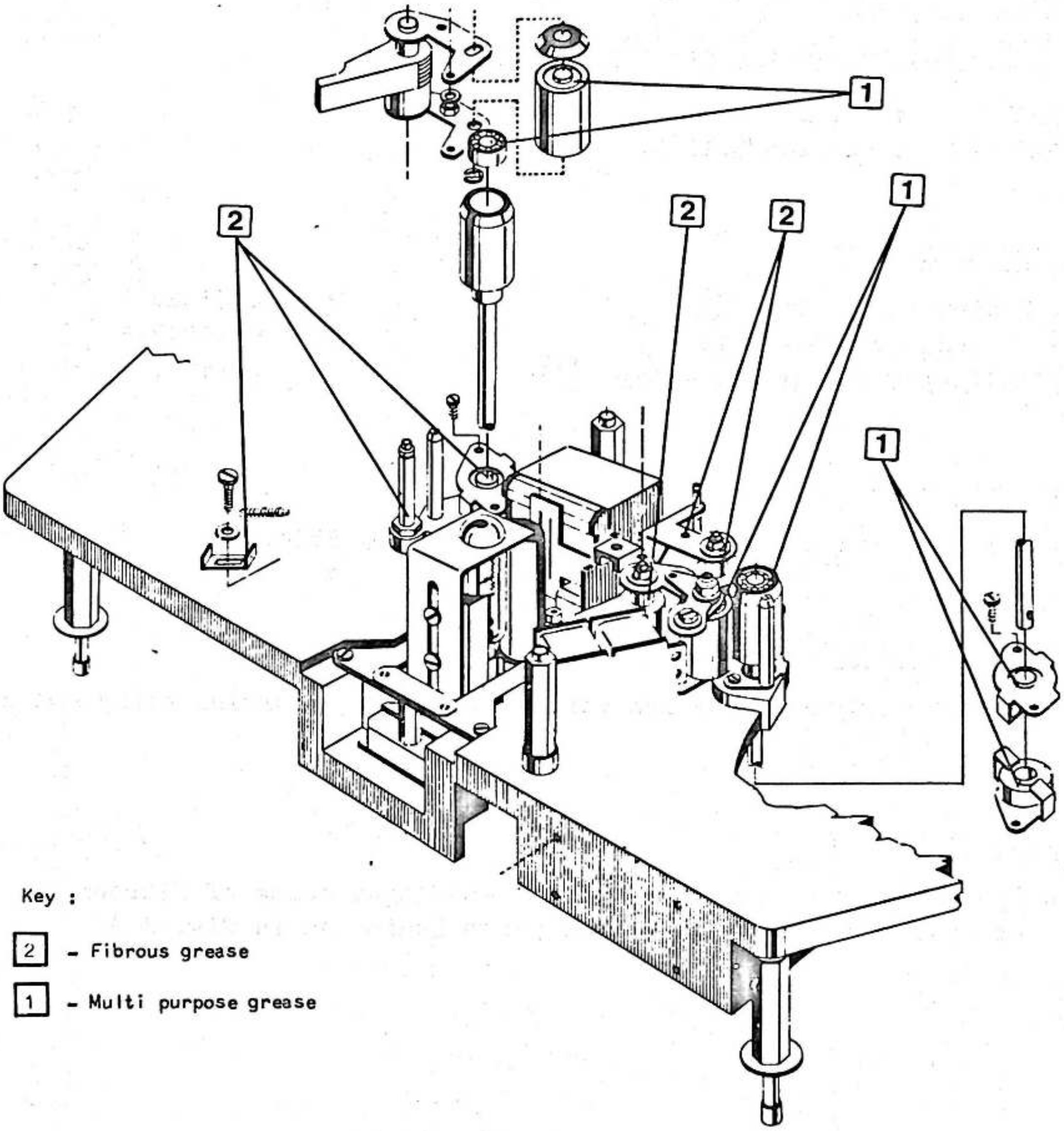


Fig. 3.2. - Drive Group

5 - FINAL CHECKS

- None.

ROUTINE : 3.5
NAME : TAPE WIND GROUP LUBRICATION
DURATION : 0.1 h
PREREQUISITES : Routine 5.1.

1 - NEEDED MATERIAL

- Medium oil - type ③	P.N. 0491020 G
- Fibrous grease - type $\boxed{2}$	" 0491017 R
- Multi-purpose grease - type $\boxed{1}$	" 0491014 D

2 - PURPOSE

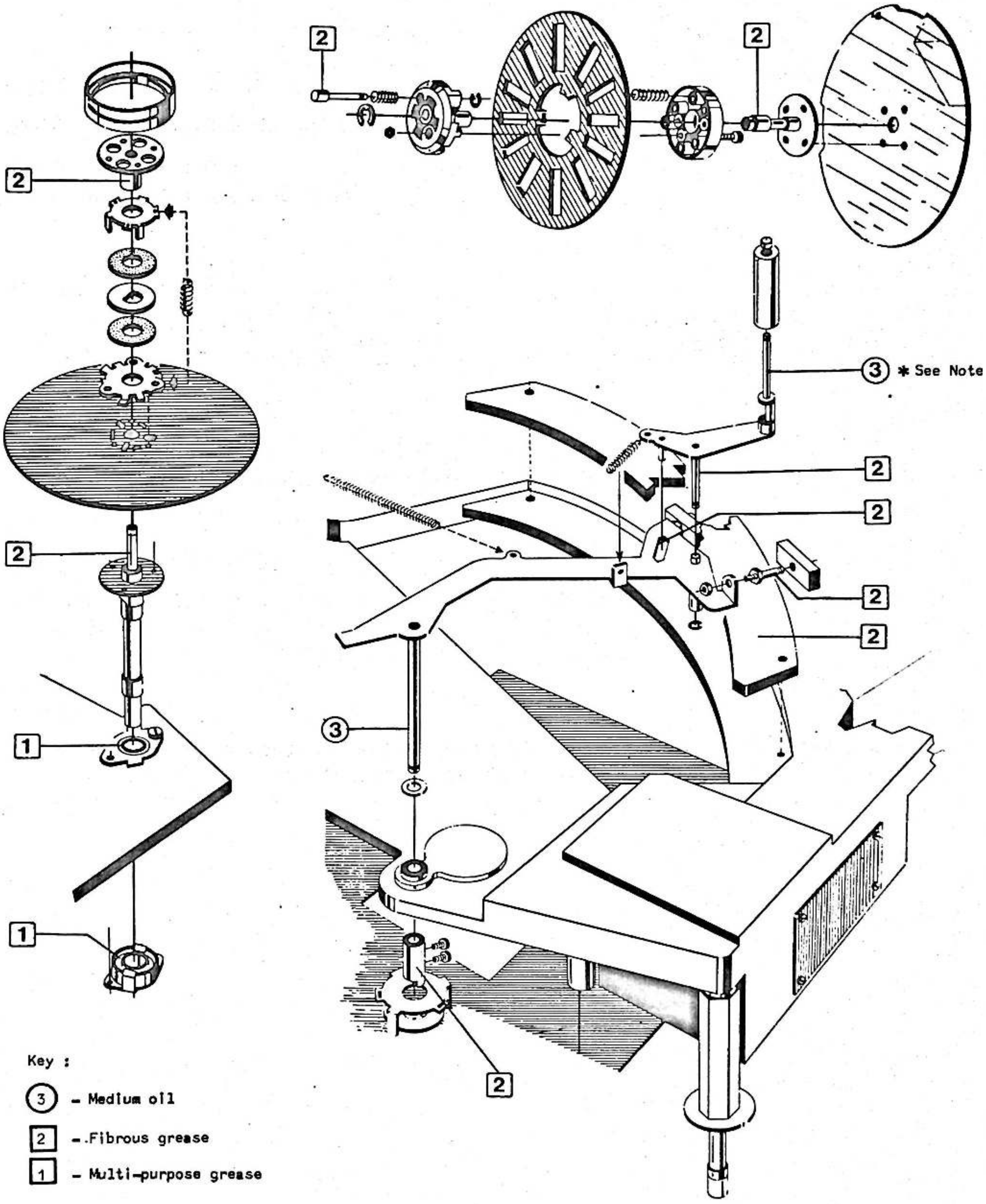
- Maintain the subsystem as efficient as possible.

3 - PRELIMINARY CHECKS

- Ensure that the parts are perfectly clean, otherwise carry out routine 3.2.

4 - PROCEDURE

- Apply 2 or 3 drops of medium oil and light coats of fibrous and multi-purpose grease on all those parts indicated in fig. 3.3.



Note * - Only for subsystems fitted with idler roller.

Fig. 3.3. - Tape Wind Group

5 - FINAL CHECKS

- None.

ROUTINE : 3.6
NAME : CLUTCH GROUP LUBRICATION
DURATION : 0.1 h
PREREQUISITES : Routine 5.1.

1 - NEEDED MATERIAL

- Medium oil - type ③	P.N. 0491020 G
- Fibrous grease - type $\boxed{2}$	" 0491017 R

2 - PURPOSE

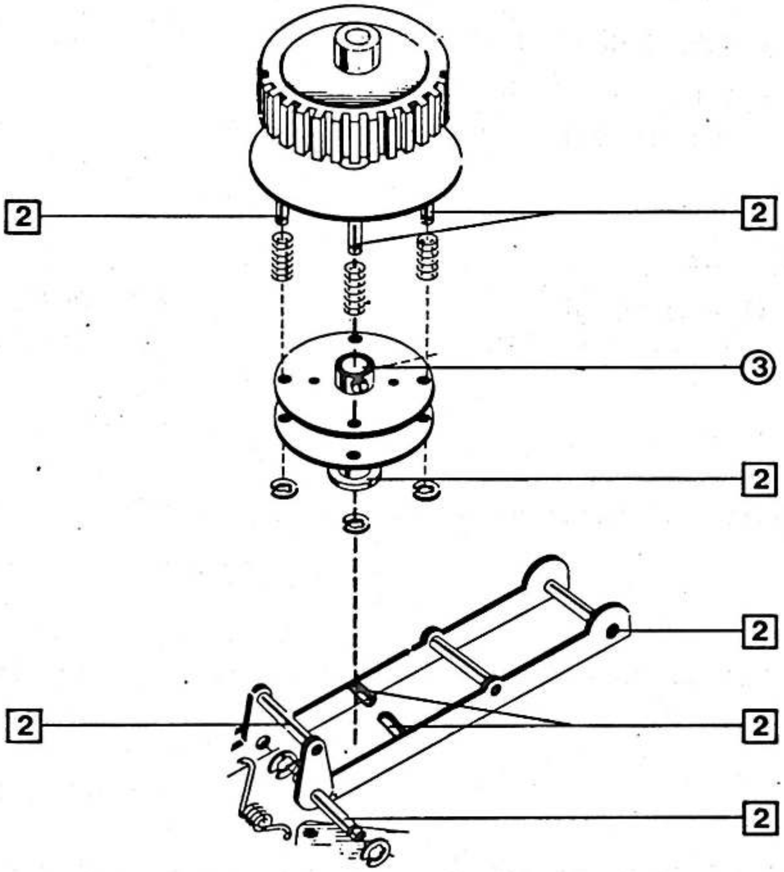
- Maintain the subsystem as efficient as possible.

3 - PRELIMINARY CHECKS

- Ensure that the parts are perfectly clean, otherwise implement routine 3.2.

4 - PROCEDURE

- Apply 2 or 3 drops of medium oil and a light coat of fibrous grease on all those parts indicated in fig. 3.4.



Key :

③ - Medium oil

2 - Fibrous grease

Fig. 3.4. - Clutch Group

5 - FINAL CHECKS

- None.

ROUTINE : **3.7**

NAME : SPEED CHANGE GROUP LUBRICATION

DURATION : 0.1 h
PREREQUISITES : Routine 5.1.

1 - NEEDED MATERIAL

- Medium oil - type ③	P.N. 0491020 G
- Fibrous grease - type $\boxed{2}$	" 0491017 R
- Multi-purpose grease type $\boxed{1}$	" 0491014 D

2 - PURPOSE

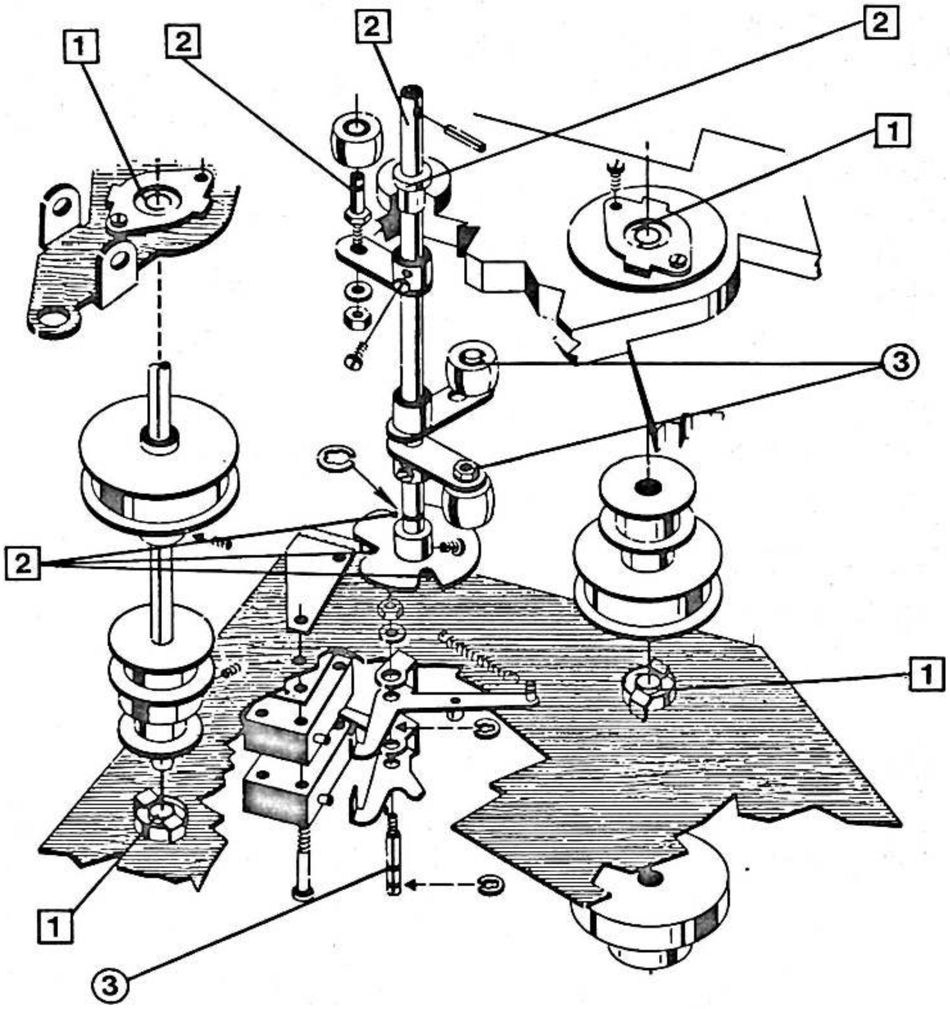
- Maintain the reader as efficient as possible.

3 - PRELIMINARY CHECKS

- Ensure that the parts are perfectly clean, otherwise implement routine 3.2.

4 - PROCEDURE

- Apply 2 or 3 drops of medium oil and light coats of fibrous and multi-purpose grease on all those parts shown in fig. 3.5.



Key :

③ - Medium oil

2 - Fibrous grease

1 - Multi-purpose grease

Fig. 3.5. - Speed Change Group

5 - FINAL CHECKS

- None.

ROUTINE : 3.8

NAME : DETECTOR and TENSION ARMS EXCLUSION GROUP LUBRICATION

DURATION : 0.1 h
PREREQUISITES : Routine 5.1.

1 - NEEDED MATERIAL

- Medium oil - type ③	P.N. 0491020 G
- Fibrous grease - type $\boxed{2}$	" 0491017 R

2 - PURPOSE

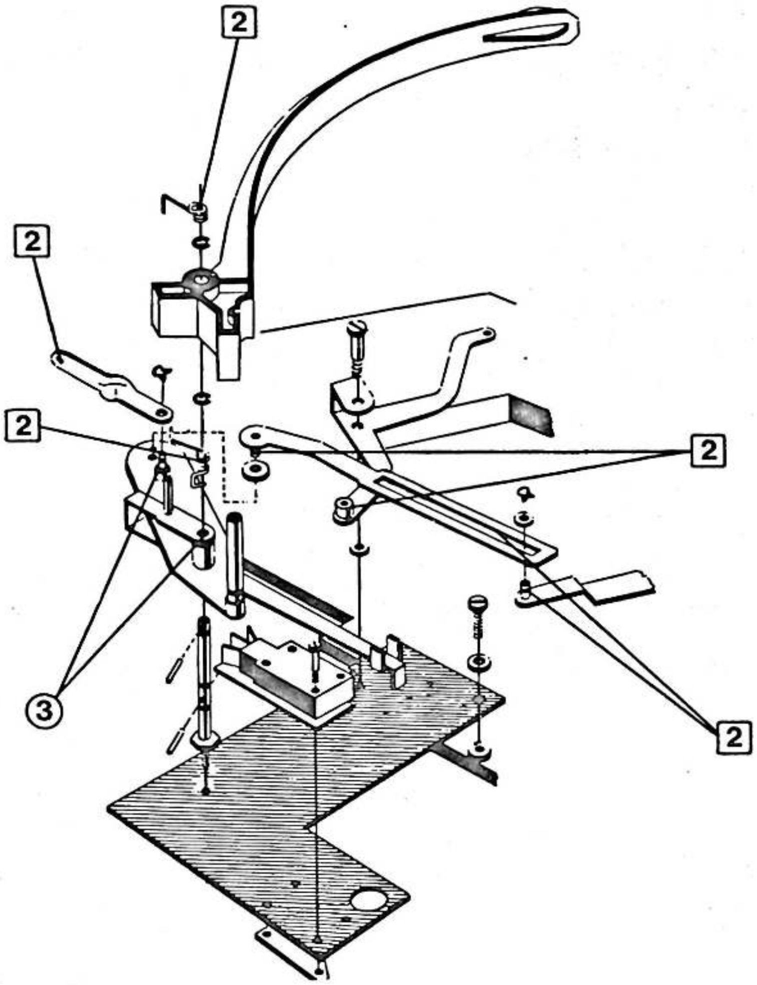
- Maintain the machine as efficient as possible.

3 - PRELIMINARY CHECKS

- Ensure that the parts are perfectly clean, otherwise implement routine 3.2.

4 - PROCEDURE

- Apply 2 or 3 drops of medium oil and a light coat of fibrous grease on all those parts indicated in fig: 3.6.



Key :

③ - Medium oil

2 - Fibrous grease

Fig. 3.6. - Arms Group

5 - FINAL CHECKS

- None.

4. ADJUSTMENTS

ROUTINE : 4.1

NAME : TAPE HANDLER PLATES HEIGHT ADJUSTMENT

DURATION : 0.4 h
PREREQUISITES : Routine 5.1.

1 - NEEDED MATERIAL

- Tape gauge - 20.5 mm for square holes	P.N. 4355272 N
- Tape gauge - 11/16 inch for 5 round holes	" 4355271 A
- Tape gauge - 7/8 inch for 6 round holes	" 4355274 F
- Tape gauge - 1 inch for 8 round holes	" 4355273 J

2 - PURPOSE

- Ensure that the tape sliding plane (for the actual tape being used) is perfectly aligned with the read photocells.

3 - PRELIMINARY CHECKS

- None.

4 - PROCEDURE

1) - Insert the gauge, corresponding to the actual tape width, between the read head and the two handler plates. See fig. 4.1.

2) - Ascertain that the gauge is correctly positioned and does not present any transversal play on the head guides.

3) - Loosen both the pulley and eccentric fixing screws.

4) - Move the eccentric so as to opportunely shift the plate to the desired height. Hence tighten the eccentric fixing screws.

5) - Correctly position the pulley and tighten the pertinent fixing screws.

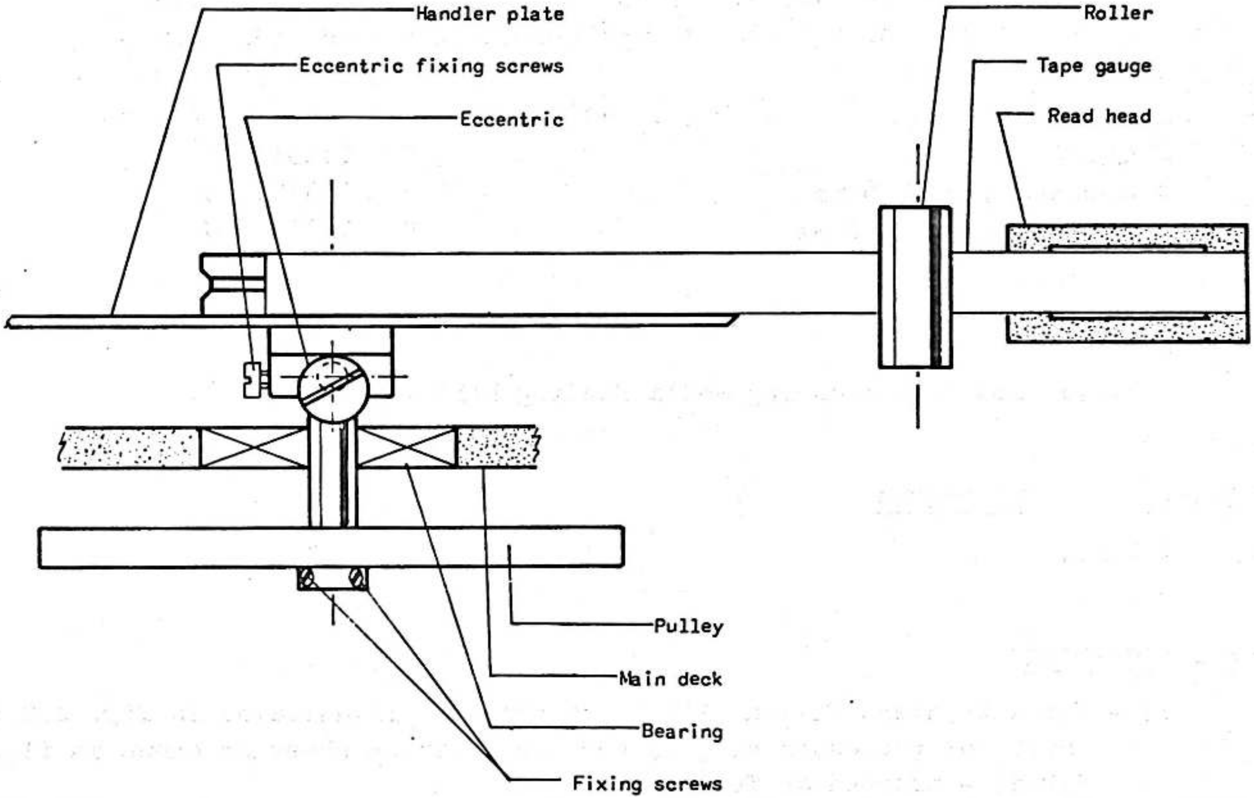


Fig. 4.1. - Tape Handler Plates

5 - FINAL CHECKS

- None.

ROUTINE : 4.2

NAME : BRAKE SHOES ADJUSTMENT

DURATION : 0.6 h
PREREQUISITES : None

1 - NEEDED MATERIAL

- Allen key 3 mm	P.N. 7133130 Y
- Allen key 4 mm	" 7133140 Z
- Open end wrench 8 mm	" 7133230 S
- Open end wrench 12 mm	" 7133250 U

2 - PURPOSE

- Avoid tape breaks during media feeding halts.

3 - PRELIMINARY CHECKS

- None.

4 - PROCEDURE

1) - For subsystems fitted with brake shoes as illustrated in fig. 4.2.b) carry out procedure step 2. For those having shoes as shown in fig. 4.2.a) - proceed as follows :

- horizontally insert two 5 mm wide tape strips between the brake shoes as shown in fig. 4.2.a),
- lower the covers to energize the solenoid, hence until tape is touched,
- withdraw the two tape strips and check that they result equally frictioned, otherwise correct the disparity by inserting spacers (P.N. 325855 PO) under the fixed shoe,
- lift the covers to de-energize the solenoid,
- vertically insert two tape strips between the brake shoes. See fig. 4.2.a),
- energize the stop solenoid
- loosen the fixed shoe fixing screws and move the shoe so as to obtain equal frictioning on both tape strips,
- tighten the fixed shoe in this position,
- de-energize the solenoid and hence remove the tape strips.

2) - For subsystems having shoes as per fig. 4.2.b), proceed as follows:
   - vertically insert two 5 mm wide tape strips between the fixed and movable brake shoes. See fig. 4.2.b),
   - adjust the eccentric post to near the movable shoe to the fixed one until tape is touched,
   - loosen the fixed shoe fixing screws and move the shoe so as to obtain equal frictioning on both tape strips,
   - when the above requirement is met, tighten the fixed shoe fixing screws,
   - extract the two tape strips.

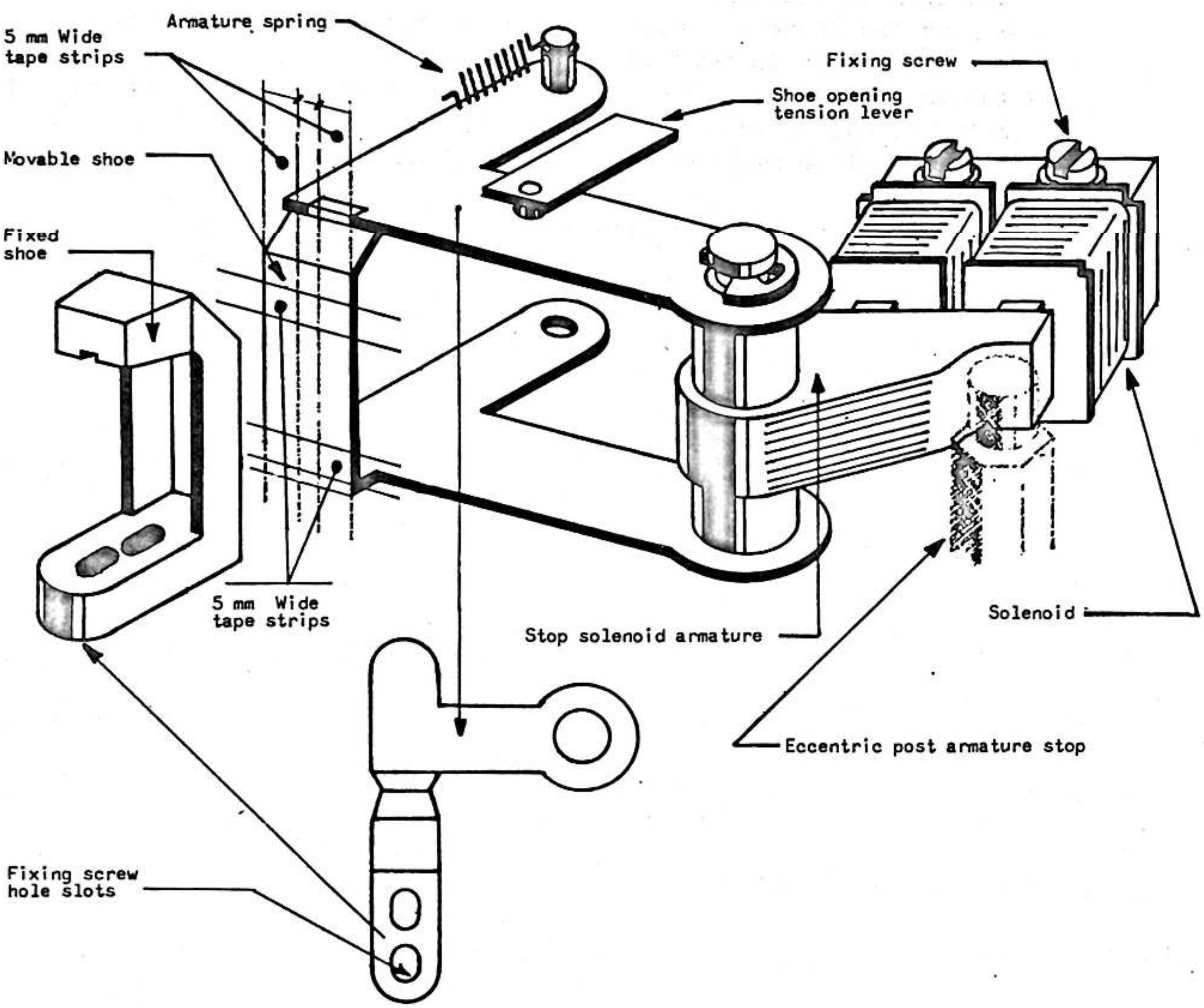


Fig. 4.2. a - Tape Brake Shoes (Old type movable shoe)

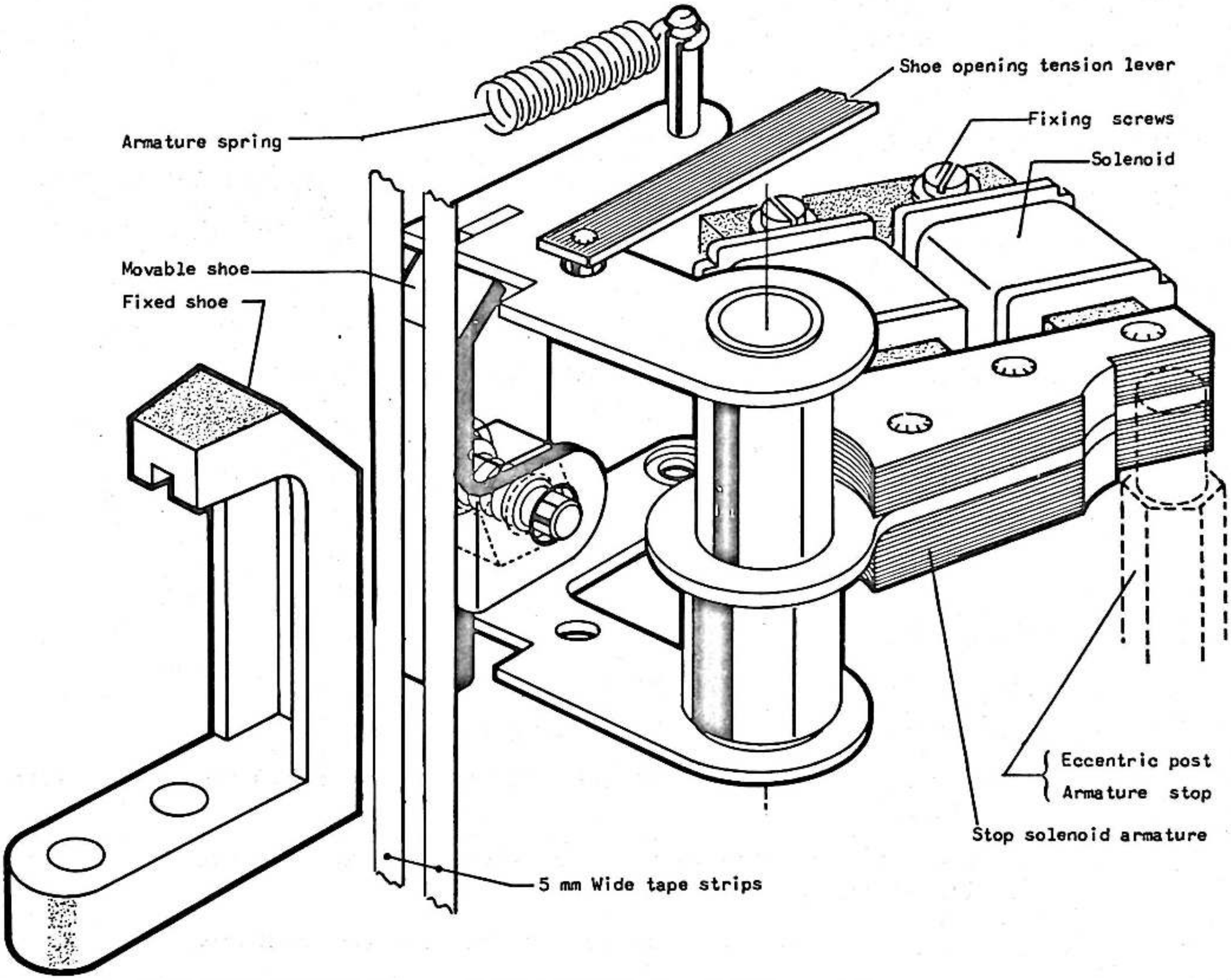


Fig. 4.2. b - Tape Brake Shoes (New type movable shoe)

5 - FINAL CHECKS

- None.

ROUTINE : 4.3

NAME : STOP SOLENOID ADJUSTMENT

DURATION : 0.4 h
PREREQUISITES : None

1 - NEEDED MATERIAL

- Allen key 4 mm	P.N. 7133140 Z
- Open end wrench 12 mm	" 7133250 U

2 - PURPOSE

Bring the tape drive stop time within the specified limits.

3 - PRELIMINARY CHECKS

- None.

4 - PROCEDURE

1) - Remove the panel fitted with the speed change knob.

2) - Loosen the solenoid bracket fixing screws.

3) - Insert a length of tape between the two brake shoes and bring them together.

4) - Holding the armature in this position, move the solenoid so as to obtain an air gap of :

$\boxed{0.1\ \text{mm}}$ for the pole nearest to the armature rotation axis.

$\boxed{0.15\ \text{mm}}$ for the pole furtherst from the armature rotation axis.

When the solenoid is no longer energized, the armature will be held positioned by its pertinent spring and the two brake shoes must impart light friction on the tape.

5) - Tighten the solenoid bracket fixing screws.

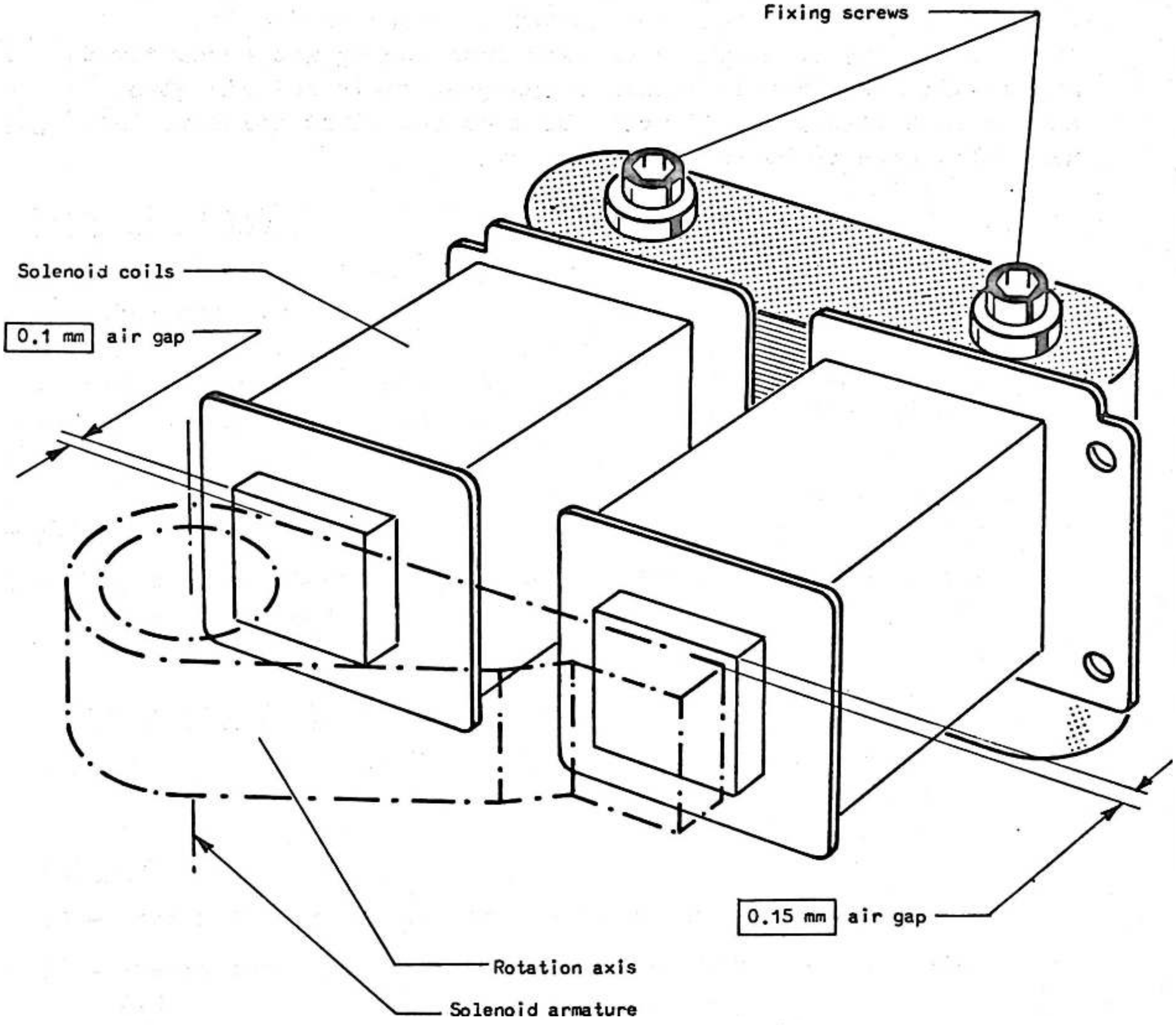


Fig. 4.3. - Stop Solenoid Group

5 - FINAL CHECKS

- Run a diagnostic to test the subsystem in the read mode.
  If difficulties to obtain a correct functioning are encountered, it may result necessary to increase the previously set air gaps.
  At the same time it could well be that the start solenoid air gaps will also have to be varied.

ROUTINE : 4.4

NAME : TAPE DRIVE ROLLERS PARALLELISM ADJUSTMENT

DURATION : 0.3 h
PREREQUISITES : None

1 - NEEDED MATERIAL

- Socket spanner	6 mm	P.N. 7133645 D
- Socket spanner	8 mm	" 7133670 E
- Open end wrench	5 mm	" 7133205 D
- Open end wrench	8 mm	" 7133230 S
- General purpose s/driver		" 7131845 J

2 - PURPOSE

- Ensure constant and uniform paper tape drive, avoiding any vertical stress on the media.

3 - PRELIMINARY CHECKS

None.

4 - PROCEDURE

1) - Loosen the driven roller and eccentric lock nuts.

2) - Insert two 5 mm wide tape strips between the two rollers. See fig. 4.4.

3) - Holding the rollers together, act on the adjust eccentric until both tape strips result equally frictioned.

4) - Repeat the operations of step 3 on four different roller positions (90° apart).
If roller eccentricity results excessive, proceed to replace the faulty roller.

5) - Tighten the eccentric and drive roller lock-nuts.

6) - Check that the drive rollers still result parallel after this adjustment procedure.

7) - Extract the two tape strips.

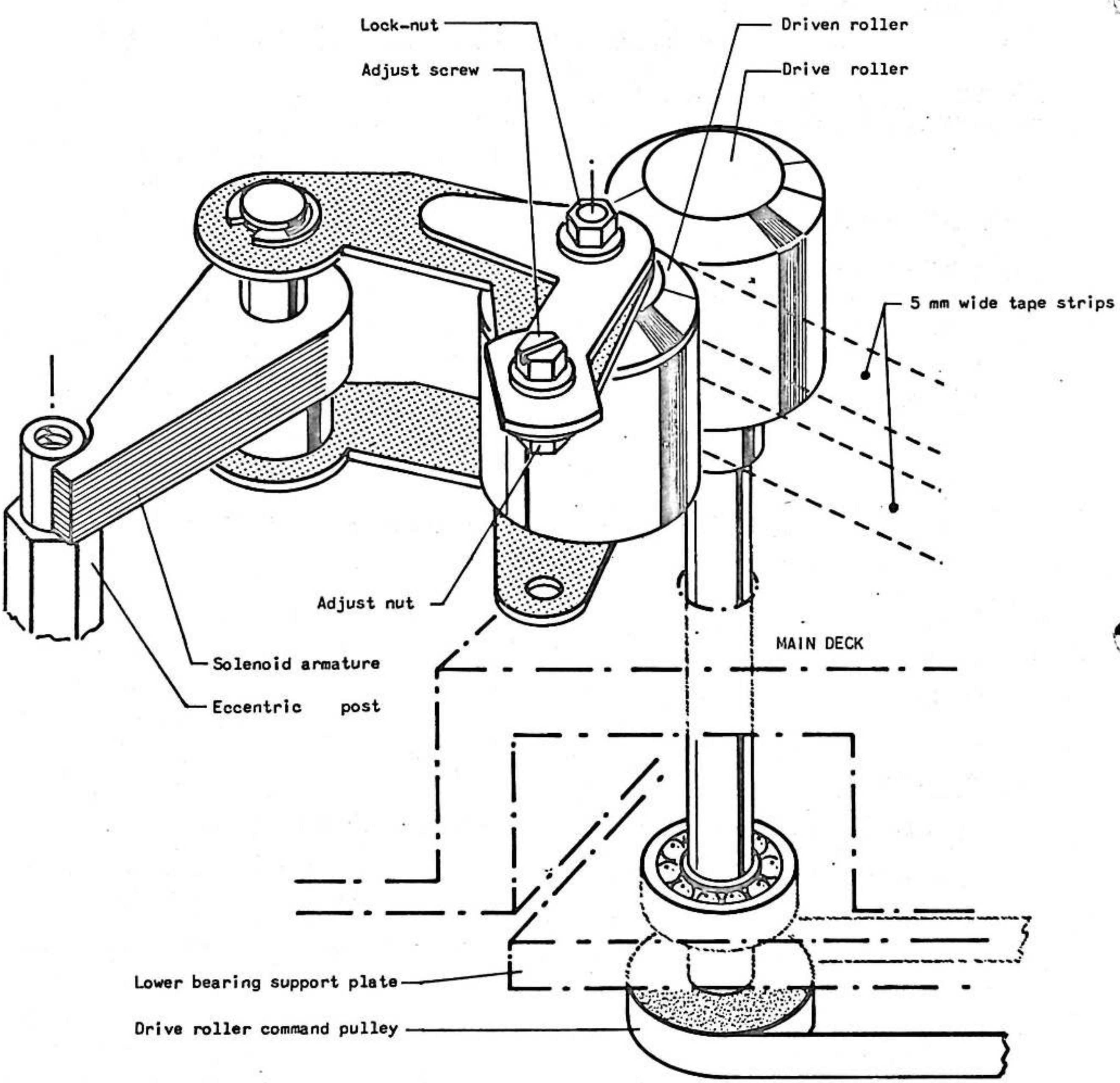


Fig. 4.4. – Tape Drive Rollers Group

5 - FINAL CHECKS

- Remove the motor fuse.
- Insert a tape strip between the previously adjusted rollers.
- Power up the subsystem and close the covers.
- Alternatively depress Start and Stop so as to impress the tape with the knurled drive roller.
- Remove the tape strip and ascertain that its entire width results equally impressed, otherwise carry out the driven roller adjustment.
- Repeat the check on various driven roller circumference points to ascertain that the roller is not eccentric.
- Replace the motor fuse.

ROUTINE : 4.5

NAME : DRIVE ROLLERS SOLENOID AIR GAP ADJUSTMENT

DURATION : 0.3 h
PREREQUISITES : None

1 - NEEDED MATERIAL

- Allen key 4 mm	P.N. 7133140 Z
- Open end wrench 12 mm	" 7133250 U

2 - PURPOSE

- Enable correct tape movement.

3 - PRELIMINARY CHECKS

- None.

4 - PROCEDURE

1) - Loosen the solenoid bracket and eccentric post fixing screws.

2) - Adjust the eccentric post to bring the rollers together in order to actually block the tape.

3) - With the armature in this position, move the solenoid to obtain an air gap of :

$\boxed{0.3\ \text{mm}}$ for the pole nearest to the armature rotation axis

$\boxed{0.2\ \text{mm}}$ for the pole furthest from the armature rotation axis

4) - Tighten the solenoid bracket fixing screws.

5) - Adjust the eccentric post in order to obtain a clearance of $\boxed{0.3\ \text{mm}}$ between the two drive rollers. Hence tighten the eccentric post.

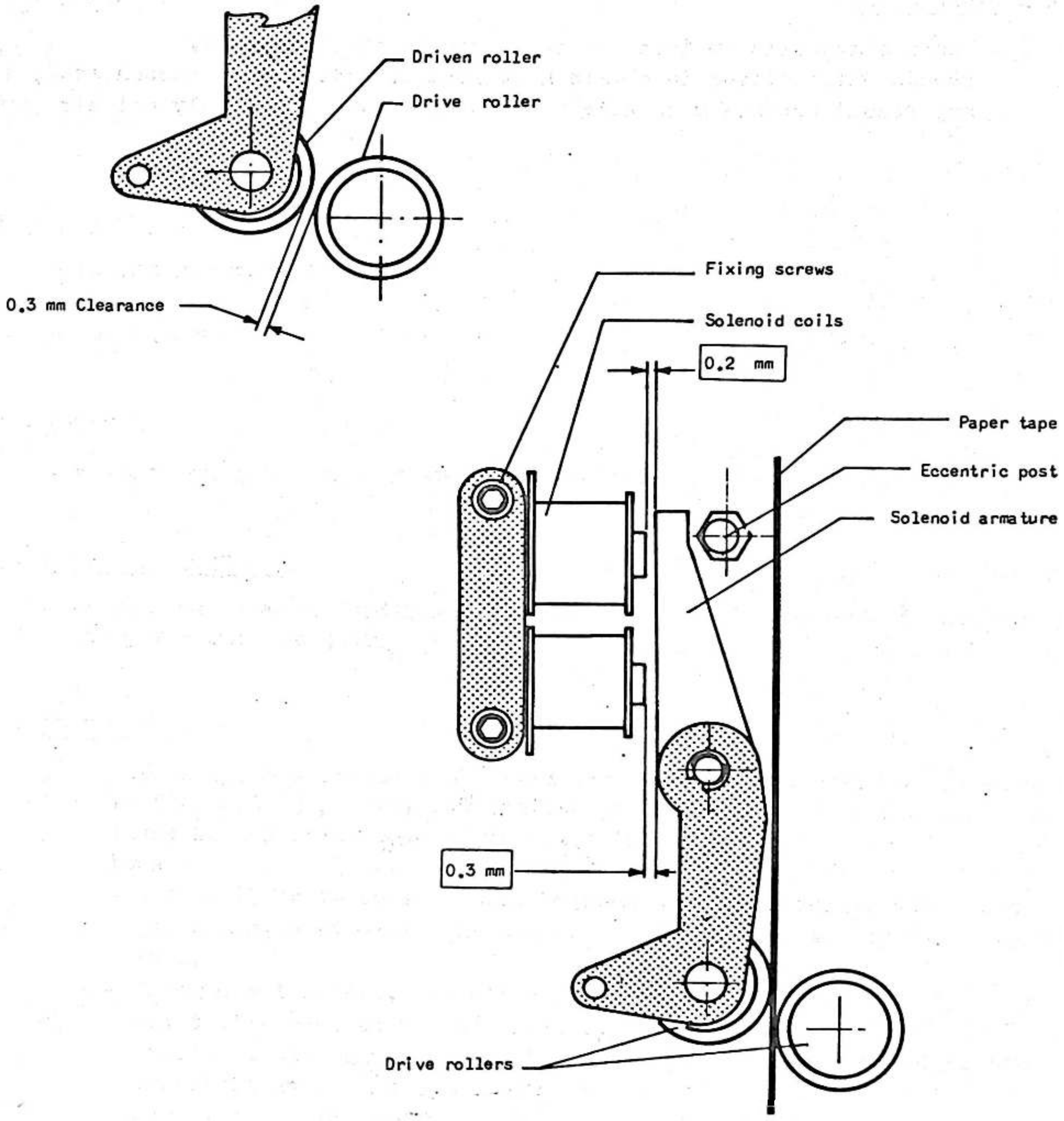


Fig. 4.5. - Drive Rollers Solenoid Group

5 - FINAL CHECKS

- Run a diagnostic to test the subsystem in the read mode.
  Should difficulties to obtain a correct functioning be encountered, it may result necessary to slightly re-adjust the previously set air gaps.

ROUTINE : 4.6

NAME : TAPE TENSION ARMS ADJUSTMENT

DURATION : 0.7 h
PREREQUISITES : Routine 5.1.

1 - NEEDED MATERIAL

- Socket spanner 7 mm	P.N. 7133665 F
- General purpose s/driver	" 7131845 J
- Set square	" 4355290 R

2 - PURPOSE

- Prevent vertical tape drive during start/stop operation phases.

3 - PRELIMINARY CHECKS

- Remove the covers. Verify the closed covers condition and, if necessary, carry out routine 4.18.

4 - PROCEDURE

1) - For subsystems fitted with fixed tape tension arm rollers as shown in fig. 4.6.b), carry out routine procedure step 2, whereas for those having rollers as illustrated in fig. 4.6.a), proceed as follows :
   - Hook a 15 to 16 cm long cord between the idler roller and panel guide pin, to simulate the tension normally imparted by the paper tape,
   - Using a set square, check the idler roller to be absolutely upright with respect to the handler plate in plane AB.
     Should it not result perpendicular, adjust the lower sliding block eccentric until the requirement is met,
   - In the same way, check the idler roller to be upright with respect to the plate in plane CD; otherwise adjust by carefully twisting the idler roller shaft until the requirement is met.

2) - For subsystems fitted with tape tension arm rollers as illustrated in fig. 4.2.b), proceed as follows :

- Hook a 15 to 16 cm long cord between the fixed roller and panel guide pin, in order to simulate the tension normally imparted by the paper tape.
- Using a set square, check the roller to be absolutely upright with respect to the handler plate in plane AB.
  If it should not result perpendicular, loosen the pertinent fixing screws and move the roller until the requirement is met.
- Again with the set square, check the roller to be upright with respect to the plate in plane CD, otherwise adjust as above to obtain the requirement.

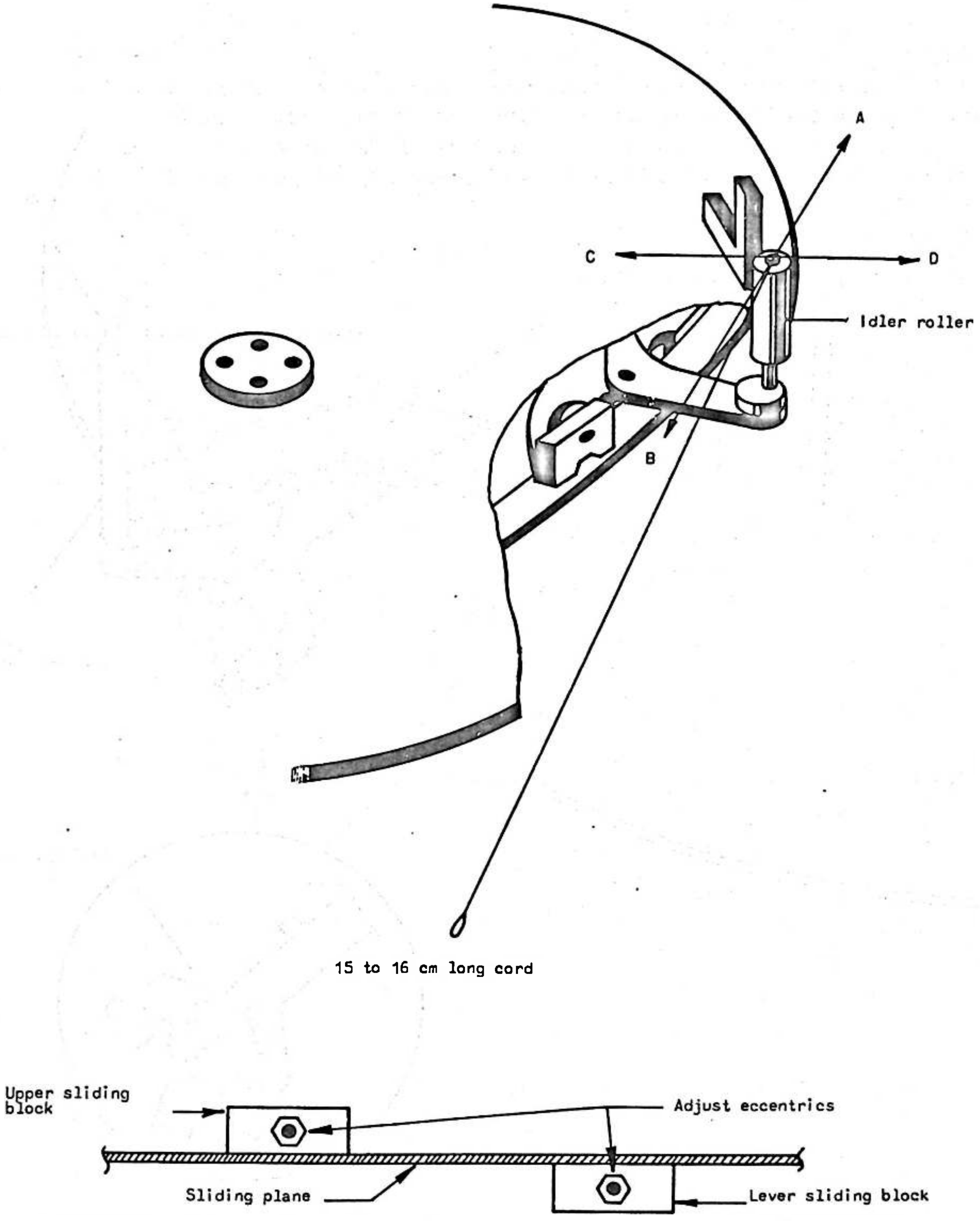


Fig. 4.6. a – 90° Idler / Roller Adjustment

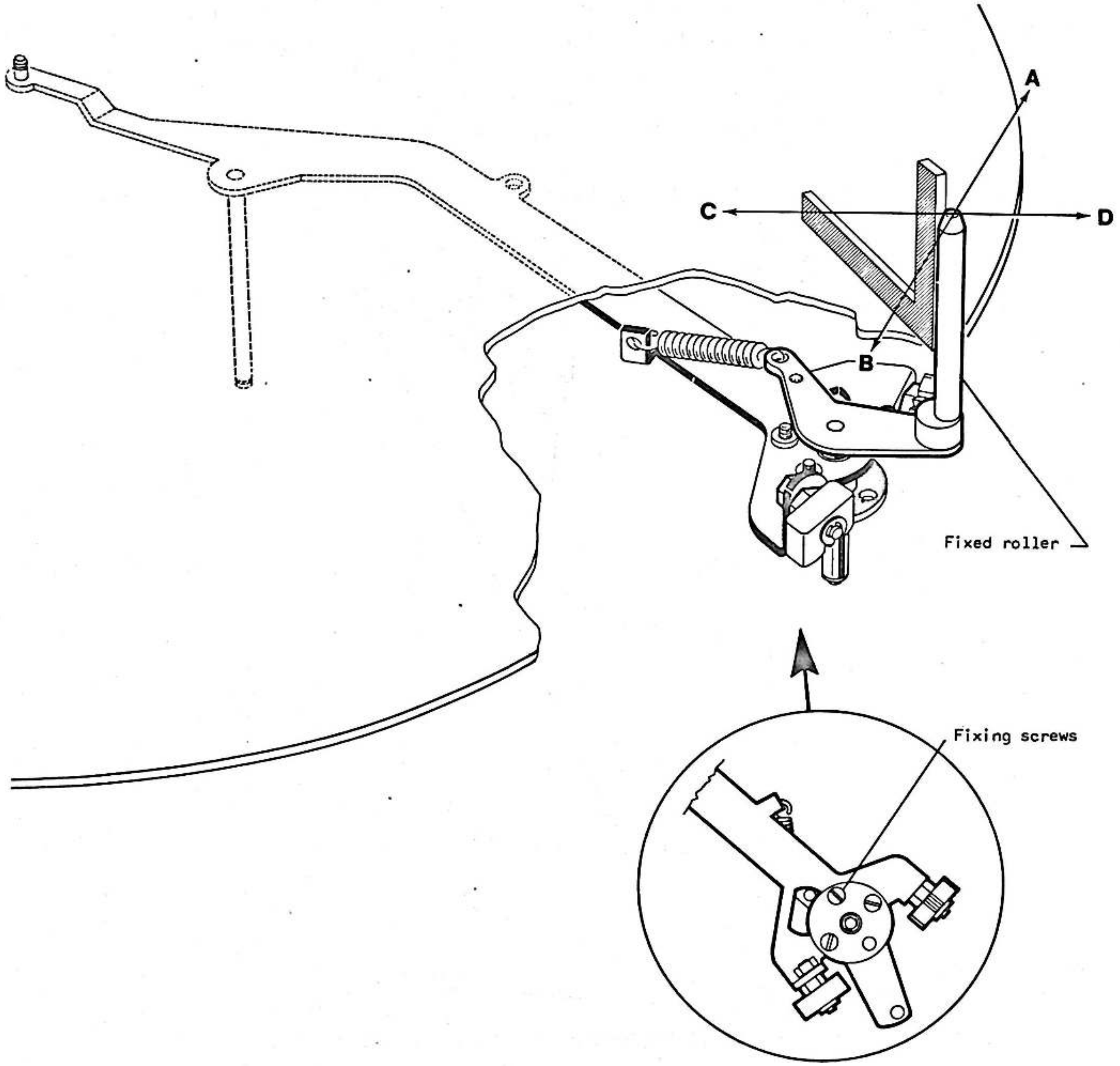


Fig. 4.6. b – 90° Fixed Roller Adjustment

5 - FINAL CHECKS

- Feed through some tape and check that during this feeding (in both directions) the tape is not inclined to slide either against the upper or lower outer plate surfaces.
  Should this not be the case, re-adjust the tension arm roller as required.

ROUTINE : **4.7**

NAME : SPEED CHANGE CAM ADJUSTMENT

DURATION : 0.2 h
PREREQUISITES : Routine 5.1.

1 - NEEDED MATERIAL

- Pliers	P.N. 7137620 A
- General purpose s/driver	" 7131845 J

2 - PURPOSE

- Ensure correspondence between change knob position and actual tape drive speed.

3 - PRELIMINARY CHECKS

- None.

4 - PROCEDURE

1) - Loosen the two cam fixing screws.

2) - With the positioning rod in the 2nd speed notch, the speed change knob coupling lug axis must be at a right angle with that of the covers shaft.
Hence tighten the fixing screws.

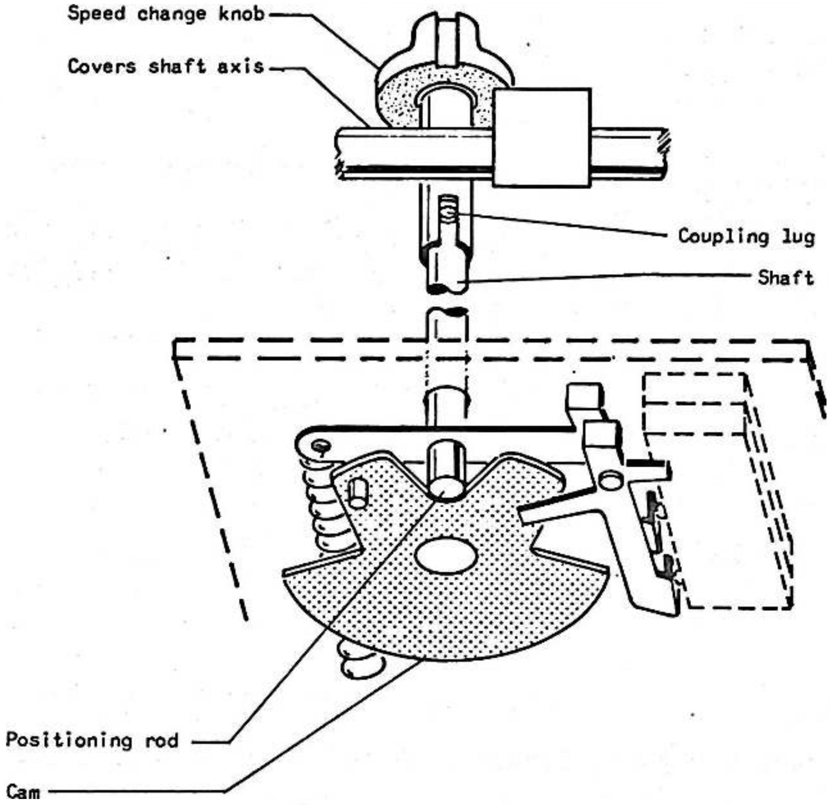


Fig. 4.7. - Speed Change Cam Group

5 - FINAL CHECKS

- None.

ROUTINE : 4.8

NAME : REWIND BELT TENSION ARM/IDLER ADJUSTMENT

DURATION : 0.3 h
PREREQUISITES : None

1 – NEEDED MATERIAL

– Open end wrench 7 mm	P.N. 7133210 Y
– Open end wrench 9 mm	" 7133230 S

2 – PURPOSE

– Ensure a correct and constant tape rewind speed.

3 – PRELIMINARY CHECKS

– None.

4 – PROCEDURE

1) – Remove the panel fitted with the speed change knob.

2) – Loosen the tension arm fixing screw.

3) – Place the speed change shaft to the rewind speed position.

4) – Move the tension arm until an idler to drive pulley gap of $\boxed{\text{3 mm}}$ is obtained. Hence tighten the tension arm fixing screws.

5) – Loosen the idler axis lock nut.

6) – Move the idler within the arm slot to obtain sufficient belt tension and hence tighten the idler lock nut.

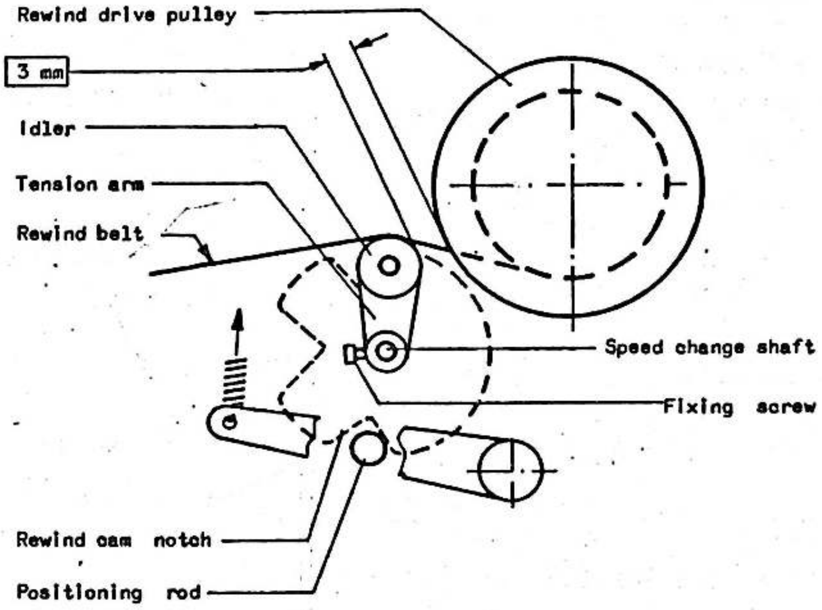


Fig. 4.8. – Rewind Belt Tension Arm/Idler

5 – FINAL CHECKS

– None.

ROUTINE : **4.9**

NAME : 2nd SPEED BELT TENSION ARM/IDLER ADJUSTMENT

DURATION : 0.3 h
PREREQUISITES : Routine 5.1.

1 - NEEDED MATERIAL

- Open end wrench 7 mm	P.N. 7133210 Y
- Open end wrench 9 mm	" 7133230 S

2 - PURPOSE

- Obtain a correct belt tension to ensure a constant drive speed.

3 - PRELIMINARY CHECKS

- None.

4 - PROCEDURE

1) - Loosen the tension arm fixing screw.

2) - Set the speed change shaft to the 2nd speed position.

3) - Move the tension arm in such a way as to impart maximum tension on the belt and tighten the fixing screws.

4) - Loosen the idler axis lock nut.

5) - Move the idler within the arm slot to further increase belt tension and tighten the idler lock nut.

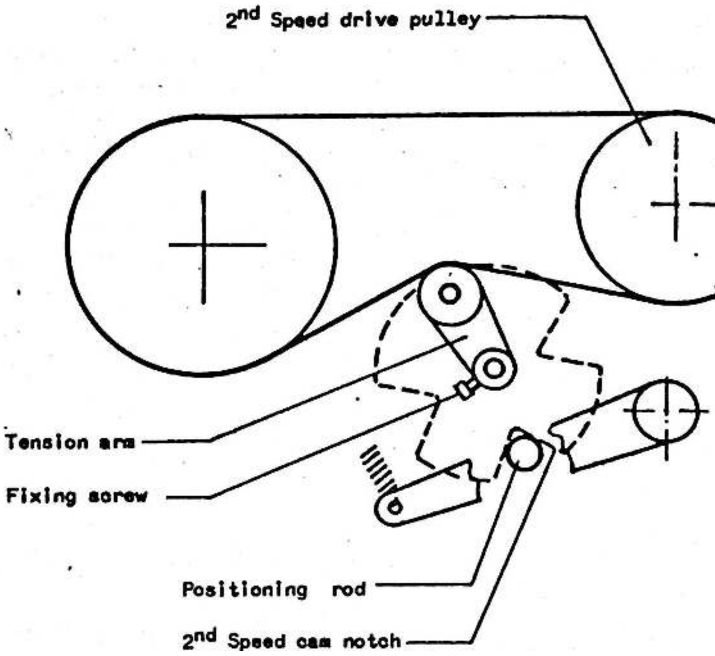


Fig. 4.9. – 2nd Speed Belt Tension Arm/Idler

5 – FINAL CHECKS

- None.

ROUTINE : 4.10

NAME : 1st SPEED BELT TENSION ARM/IDLER ADJUSTMENT

DURATION : 0.3 h
PREREQUISITES : Routine 5.1.

1 - NEEDED MATERIAL

- Open end wrench	7 mm	P.N. 7133210 Y
- Open end wrench	9 mm	" 7133230 S

2 - PURPOSE

- Obtain a correct belt tension to ensure a constant drive speed.

3 - PRELIMINARY CHECKS

- None.

4 - PROCEDURE

1) - Loosen the tension arm fixing screw.

2) - Place the speed change shaft on the cam rewind notch.

3) - Move the tension arm to obtain an idler to outer bearing support plate distance of roughly $\boxed{60\text{ mm}}$ hence tighten the tension arm fixing screw.

4) - Set the speed change shaft to the 1st speed position.

5) - Loosen the idler axis lock nut.

6) - Move the idler within the arm slot so as to obtain maximum belt tension and hence tighten the idler lock nut.

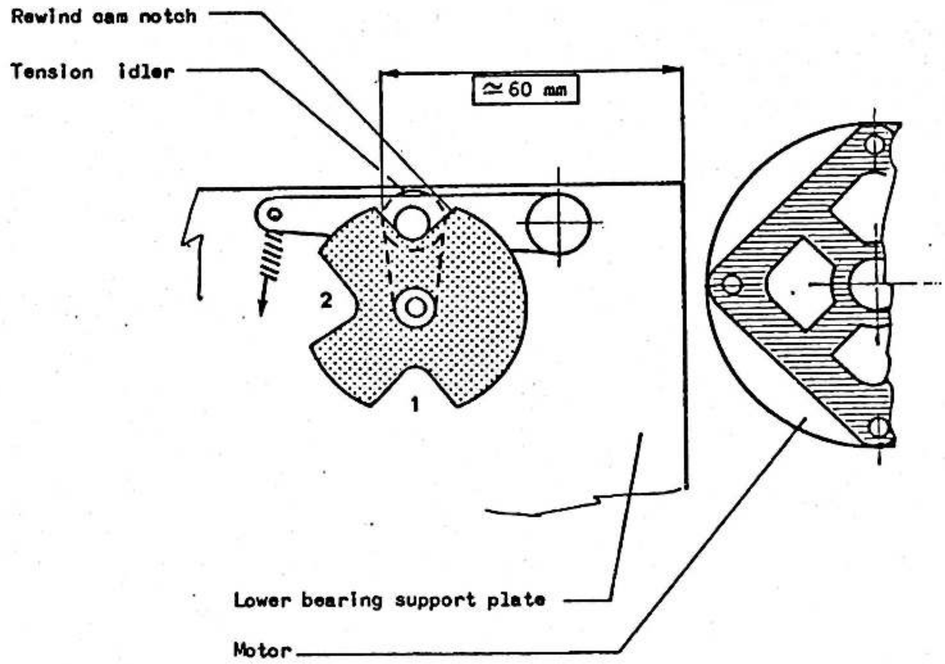


Fig. 4.10. – 1st Speed Belt Tension Arm/Idler

5 – FINAL CHECKS

- None.

ROUTINE : 4.11

NAME : CLUTCH ADJUSTMENT

DURATION : 0.5 h
PREREQUISITES : None

1 - NEEDED MATERIAL

- General purpose s/driver	P.N. 7131845 J
- Feeler gauge mm	" 7257213 E

2 - PURPOSE

- Avoid clutch slippage.

3 - PRELIMINARY CHECKS

- None.

4 - PROCEDURE

1) - Open the covers.

2) - Remove the panel fitted with the speed change knob.

3) - Insert a 0.6 mm feeler between the spring pressure disc and clutch release plate.

4) - Close the covers.

5) - Loosen the two pressure disc fixing screws and move the disc to obtain a $\boxed{\text{0.8 to 1 mm}}$ clearance, between the clutch command lever pins and release plate collar (visual check).

6) - Tighten the disc fixing screws and extract the feeler gauge.

7) - Check that under these conditions, the command lever rests on the cover shaft cam.

8) - Open the covers.

9) - Loosen the two upper clutch disc fixing screws.

10) - Insert a 0.8 mm feeler gauge, on either side of the shaft, between this upper disc and the toothed drive pulley lining.

11) - Tighten the upper clutch disc in this position and then extract the feelers.

12) - Close and open the covers several times and check that the 4 springs guarantee a secure and correct clutch release.

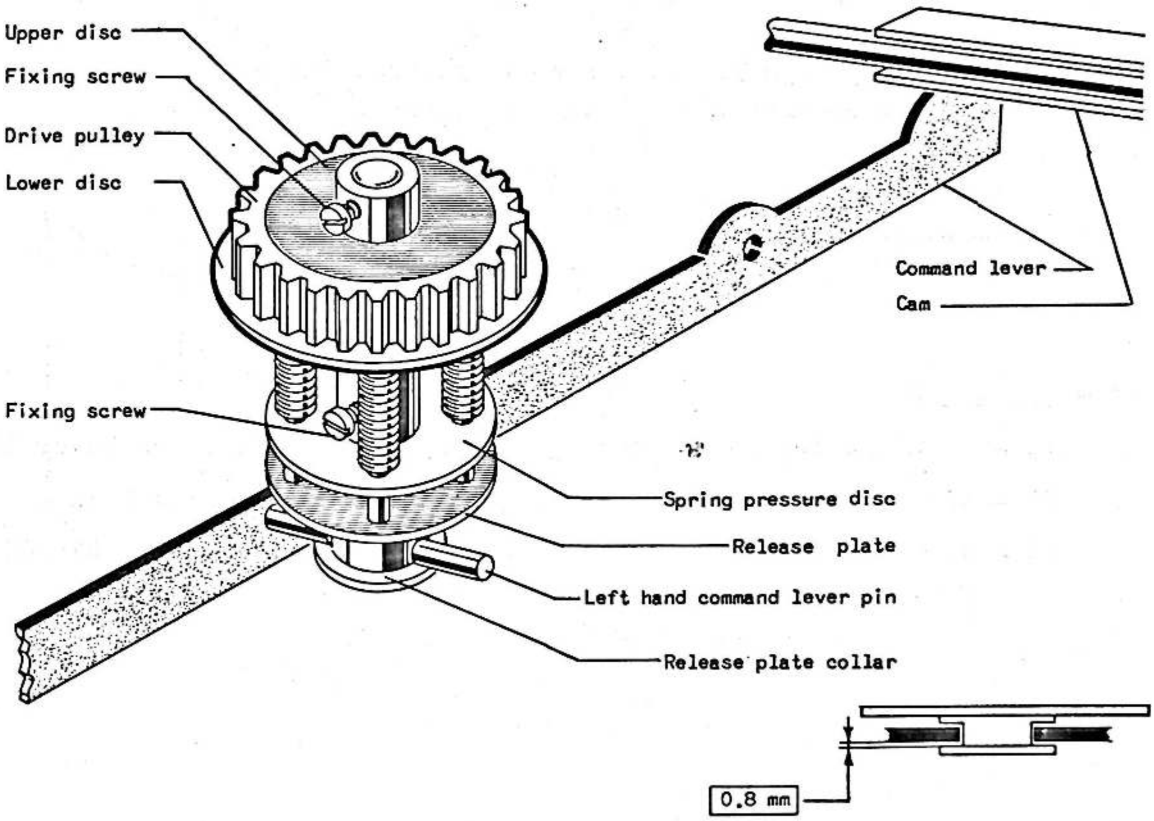


Fig. 4.11. - Clutch Group

5 - FINAL CHECKS

- None.

ROUTINE : 4.12

NAME : TAPE PRESSURE PAD ADJUSTMENT

DURATION : 0.3 h
PREREQUISITES : None

1 - NEEDED MATERIAL

- Open end wrench 6 mm P.N. 7133210 Y

2 - PURPOSE

- Ensure easy tape loading operations, when the covers are open, and perfect tape drive, when they are closed.

3 - PRELIMINARY CHECKS

- None.

4 - PROCEDURE

1) - Open the covers and loosen the pressure pad release lever look nut.
2) - Adjust the release lever to part the tape from the head guides.
3) - Tighten the lock nut and check that, with the covers closed, the pressure pad rests securely on the head.

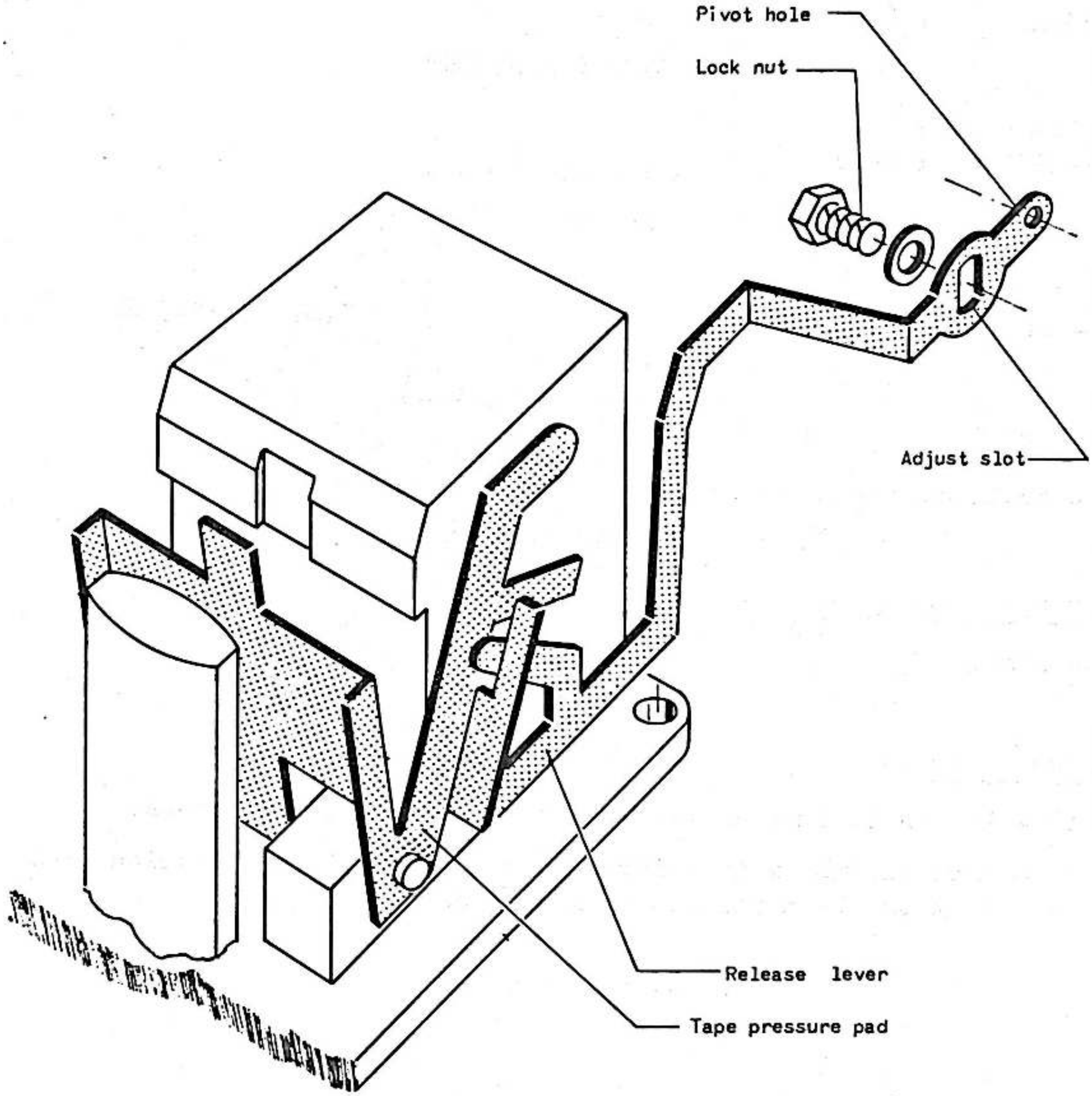


Fig. 4.12. - Tape Pressure Pad Group

5 - FINAL CHECKS

- None.

ROUTINE : 4.13

NAME : MOTOR BELT TENSION ADJUSTMENT

DURATION : 0.2 h
PREREQUISITES : None

1 - NEEDED MATERIAL

- Big s/driver P.N. 7131145 K

2 - PURPOSE

- Avoid eccessive motor belt wear and shaft stress.

3 - PRELIMINARY CHECKS

- None.

4 - PROCEDURE

1) - Loosen both motor adjustment and motor fixing screws.

2) - Move the motor in order to obtain correct belt tension and then tighten the pertinent fixing screws.

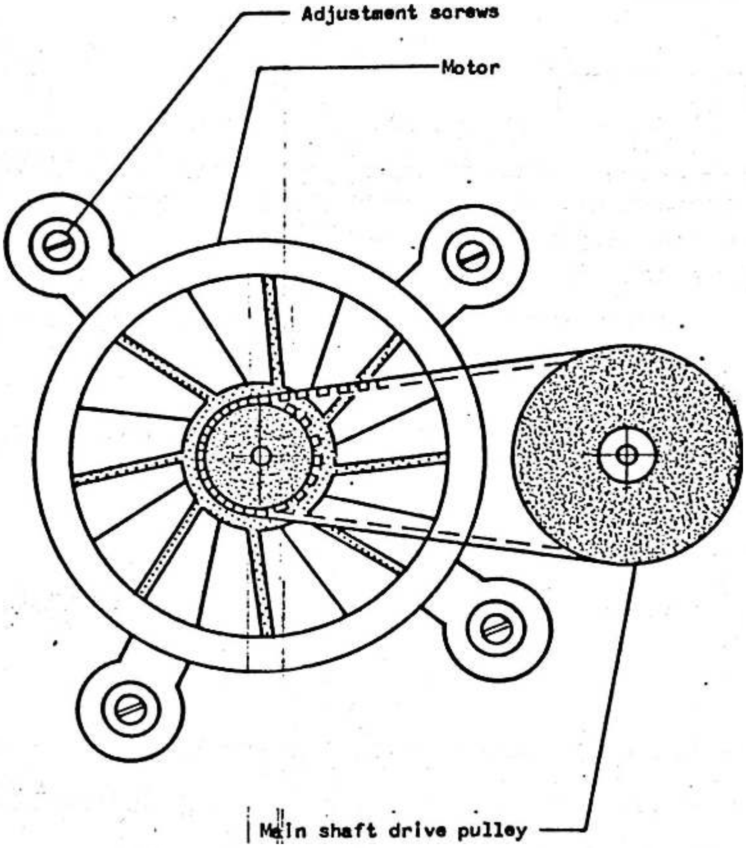


Fig. 4.13. – Motor Belt

5 – FINAL CHECKS

- None.

ROUTINE : **4.14**

NAME : PLATE to COVER PARALLELISM ADJUSTMENT

DURATION : 0.4 h
PREREQUISITES : None

1 – NEEDED MATERIAL

– Check pads jig	P.N. 4355270 C
– General purpose s/driver	" 7131845 J
– Reference pin 2.5 mm diam.	" 4355291 L
– Open end wrench 5 mm	" 7133205 D

2 – PURPOSE

– Ensure linear tape drive and consequent even packing.

3 – PRELIMINARY CHECKS

– None.

4 – PROCEDURE

1) – Remove the small oounter-plate shaft lid.

2) – Open the cover and place the check pads on the plate.

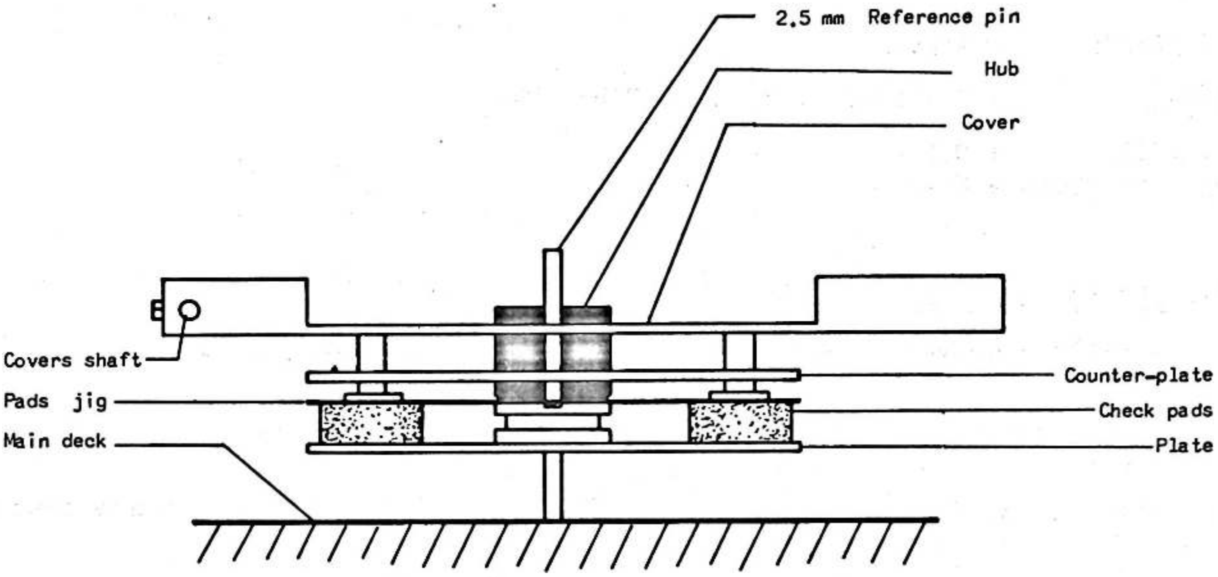
3) – Close the cover and move the check jig so as the pads are free to enter in the counter-plate slots.

4) – Loosen the two fixing screws.

5) – Insert the 2.5 mm reference pin in the counter-plate and move the cover until the reference pin is fully inserted in the hub hole.

6) – Hold the cover against the jig pads and tighten the pertinent fixing screws.

7) – Repeat the above described operations on the other cover.



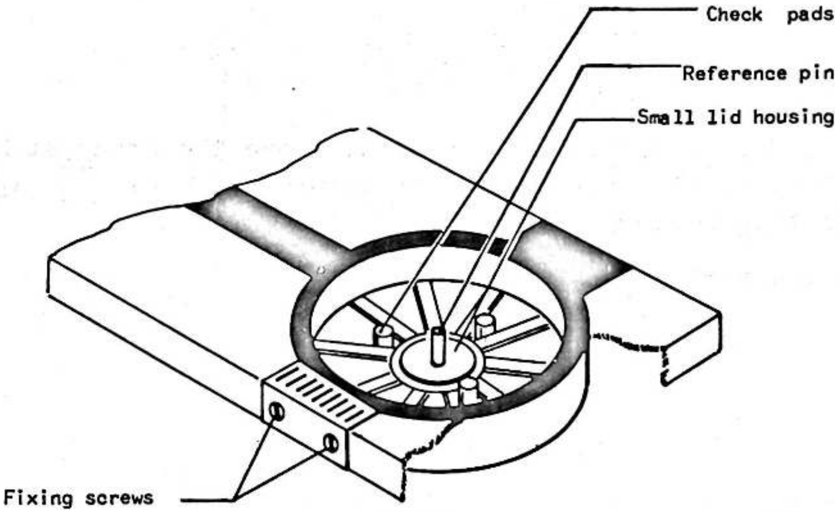


Fig. 4.14. - Cover to Plate Alignment

5 - FINAL CHECKS

- None.

ROUTINE : 4.15
NAME : COVERS MICROSWITCH ADJUSTMENT
DURATION : 0.2 h
PREREQUISITES : None

1 - NEEDED MATERIAL

- Small s/driver P.N. 4355475 P

2 - PURPOSE

- Ensure an "Out of Service" status when the subsystem covers are opened.

3 - PRELIMINARY CHECKS

- None.

4 - PROCEDURE

1) - Open the covers.

2) - Loosen the microswitch fixing screws. Move the group within the screw slots until actual switching occurs and a 1 mm gap, between the actuating lever and switch body, is obtained.

3) - Tighten the pertinent fixing screws.

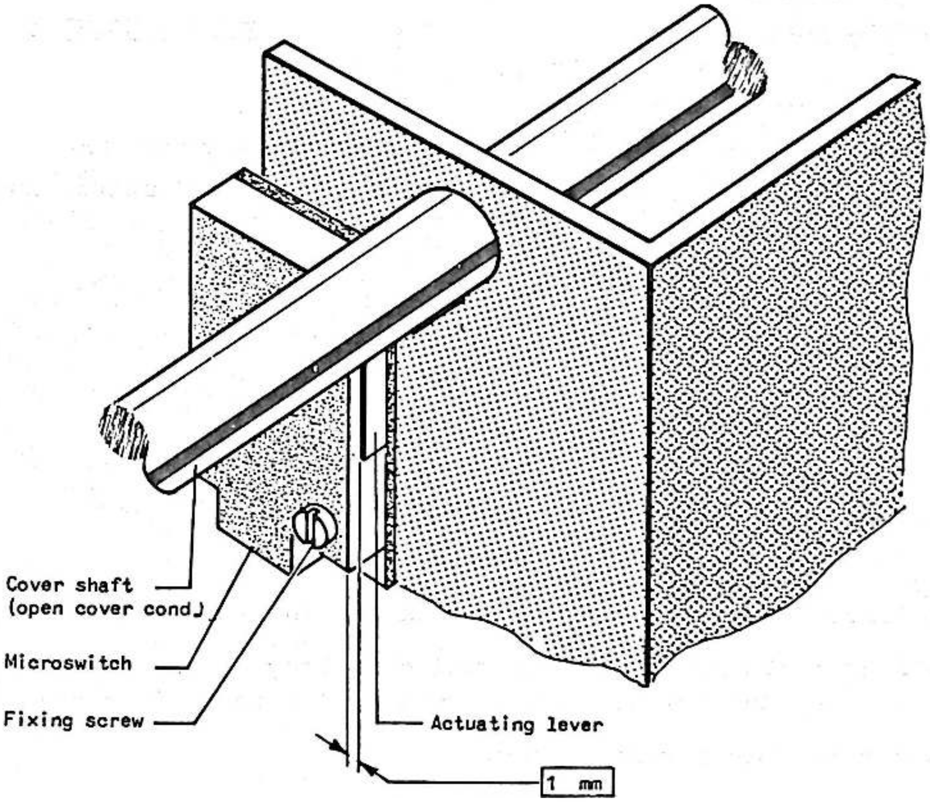


Fig. 4.15. - Open Covers Interlock Microswitch

5 - FINAL CHECKS

- None.

ROUTINE : 4.16

NAME : SPEED CHANGE MICROSWITCH ADJUSTMENT

DURATION : 0.3 h
PREREQUISITES : Routine 5.1.

1 – NEEDED MATERIAL

- Small s/driver P.N. 4355475 P

2 – PURPOSE

- Ensure correspondence between switch signals and actual switch positions.

3 – PRELIMINARY CHECKS

- None.

4 – PROCEDURE

1) – Loosen the microswitch fixing screws.
2) – Place the speed change shaft on the 1st speed cam notch.
3) – Adjust the group until actual switching occurs and a $\boxed{1\text{ mm}}$ gap, between the actuating lever and switch body, is obtained.
4) – Tighten the fixing screws.

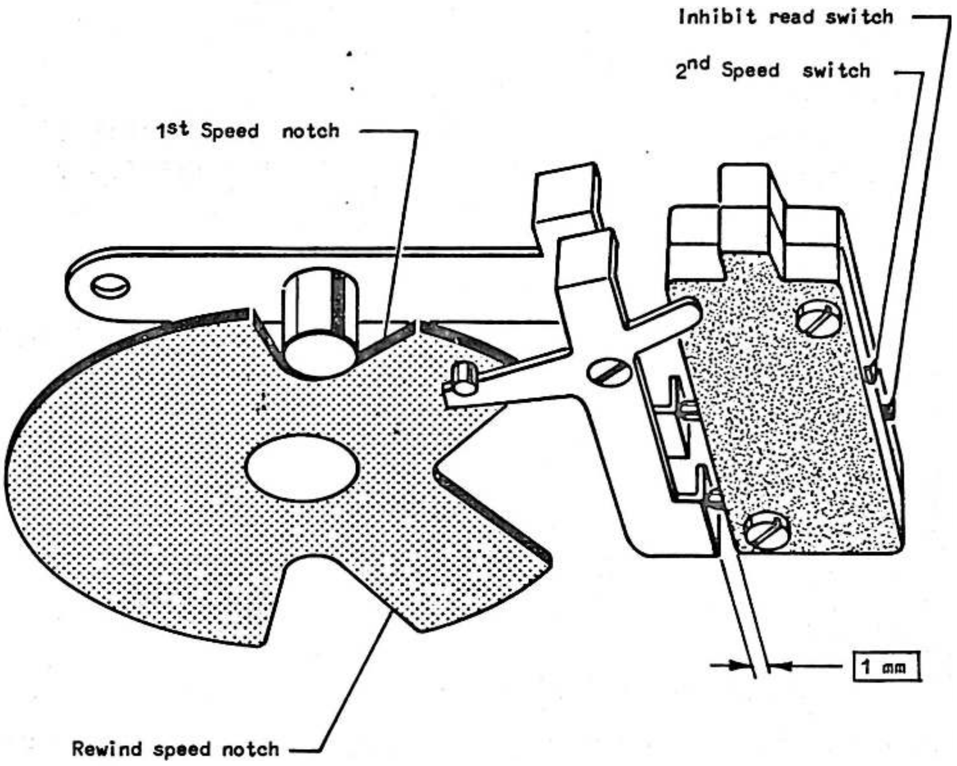


Fig. 4.16. - Speed Change Switch

5 - FINAL CHECKS

- None.

ROUTINE : **4.17**

NAME : END of TAPE MICROSWITCH ADJUSTMENT

DURATION : 0.3 h
PREREQUISITES : Routine 5.1.

1 - NEEDED MATERIAL

- Feeler gauge mm	P.N. 7257213 E
- Small s/driver	" 4355475 P

2 - PURPOSE

- Ensure a tape drive stop with still sufficient tape left on the handler to enable an automatic rewind.

3 - PRELIMINARY CHECKS

- None.

4 - PROCEDURE

1) - Loosen the microswitch fixing screws.

2) - With the detection arm positioned in such a way as its metallic rib results $\boxed{\text{0.8 to 1.2 mm}}$ from the bottom of the hub race, adjust the switch group until actual switching is obtained.

3) - Tighten the group in place.

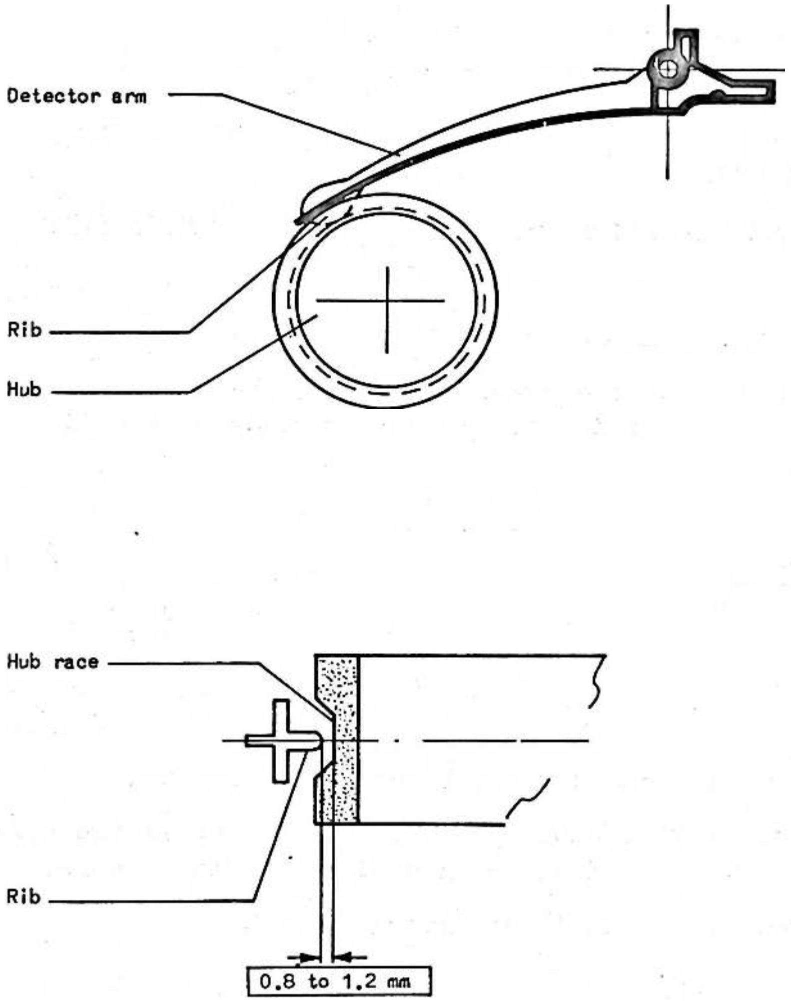


Fig. 4.17. – End of Tape Microswitch Setting

5 – FINAL CHECKS

– None.

ROUTINE : 4.18

NAME : ARMS EXCLUSION GROUP CAM ADJUSTMENT

DURATION : 0.2 h
PREREQUISITES : Routine 5.1.

1 - NEEDED MATERIAL

- General purpose s/driver	P.N. 7131845 J

2 - PURPOSE

- Ensure that, when the covers are open, the tape tension arm roller results aligned with the driven roller so as to enable easy loading operations.

3 - PRELIMINARY CHECKS

- None.

4 - PROCEDURE

1) - Loosen the command crank lever fixing screws.

2) - With the covers closed, adjust the cam until the spring tension lever cam follower just rests on its top dead centre.

3) - Tighten the crank lever fixing screws.

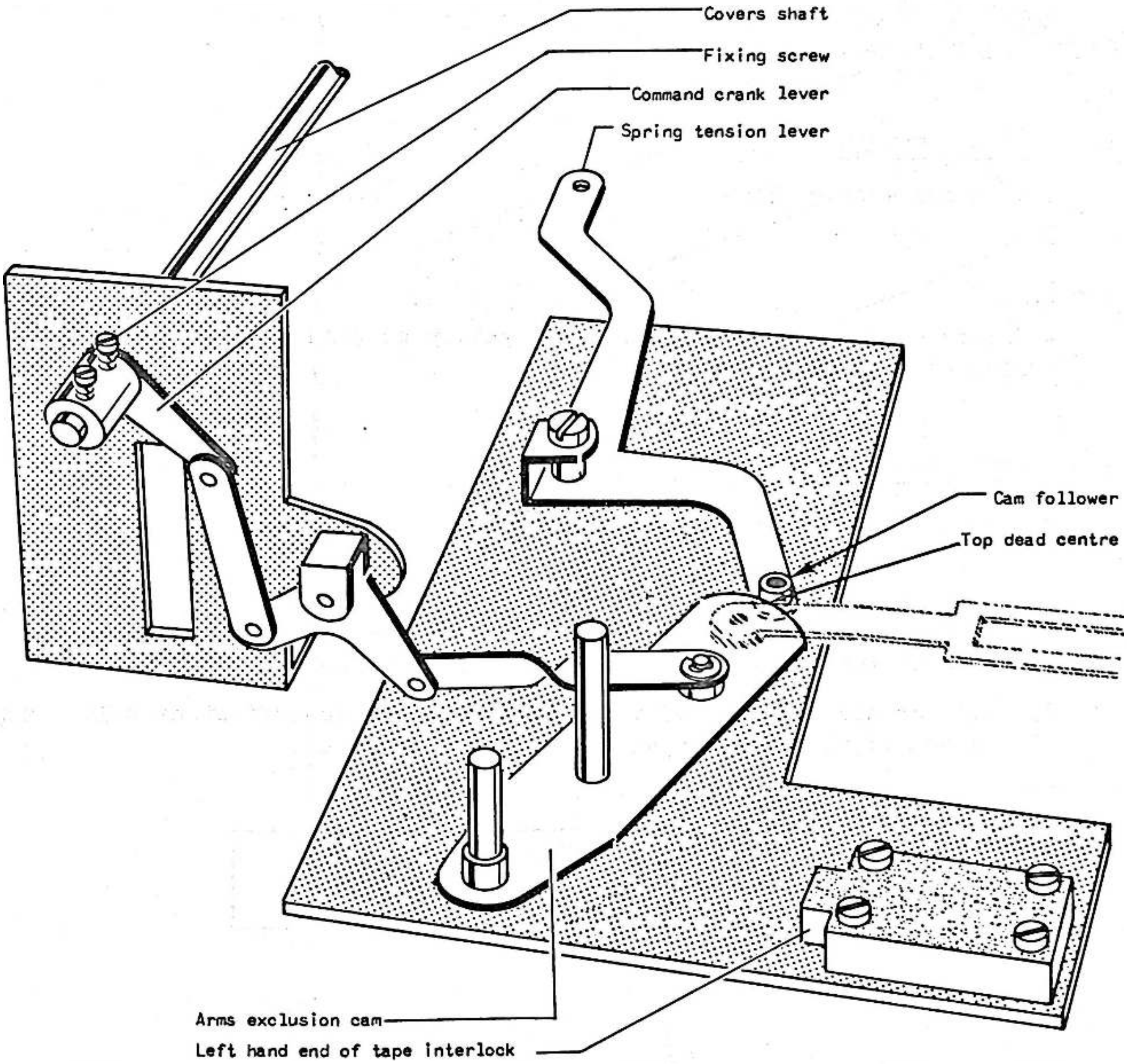


Fig. 4.18. – Arms Exclusion Cam Group

5 – FINAL CHECKS

– None.

ELECTRIC
ORMATION SYSTEMS ITALIA

INE : 4.19
: DRIVE BELT TENSION ADJUSTMENT
ATION : 0.2 h
EREQUISITES : Routine 5.1.

- NEEDED MATERIAL

- Open end wrench 7 mm P.N. 7133210 Y

2 - PURPOSE

- Ensure correct drive pulley/driven pulley coupling and consequent efficient tape drive.

3 - PRELIMINARY CHECKS

- None.

4 - PROCEDURE

1) - Loosen the 4 belt tension idlers fixing screws.
2) - Adjust the position of these idlers to obtain sufficient belt tension and therefore tighten the idlers in place.

> **Note**
>
> The belt fibre surface must face the drive pulley.

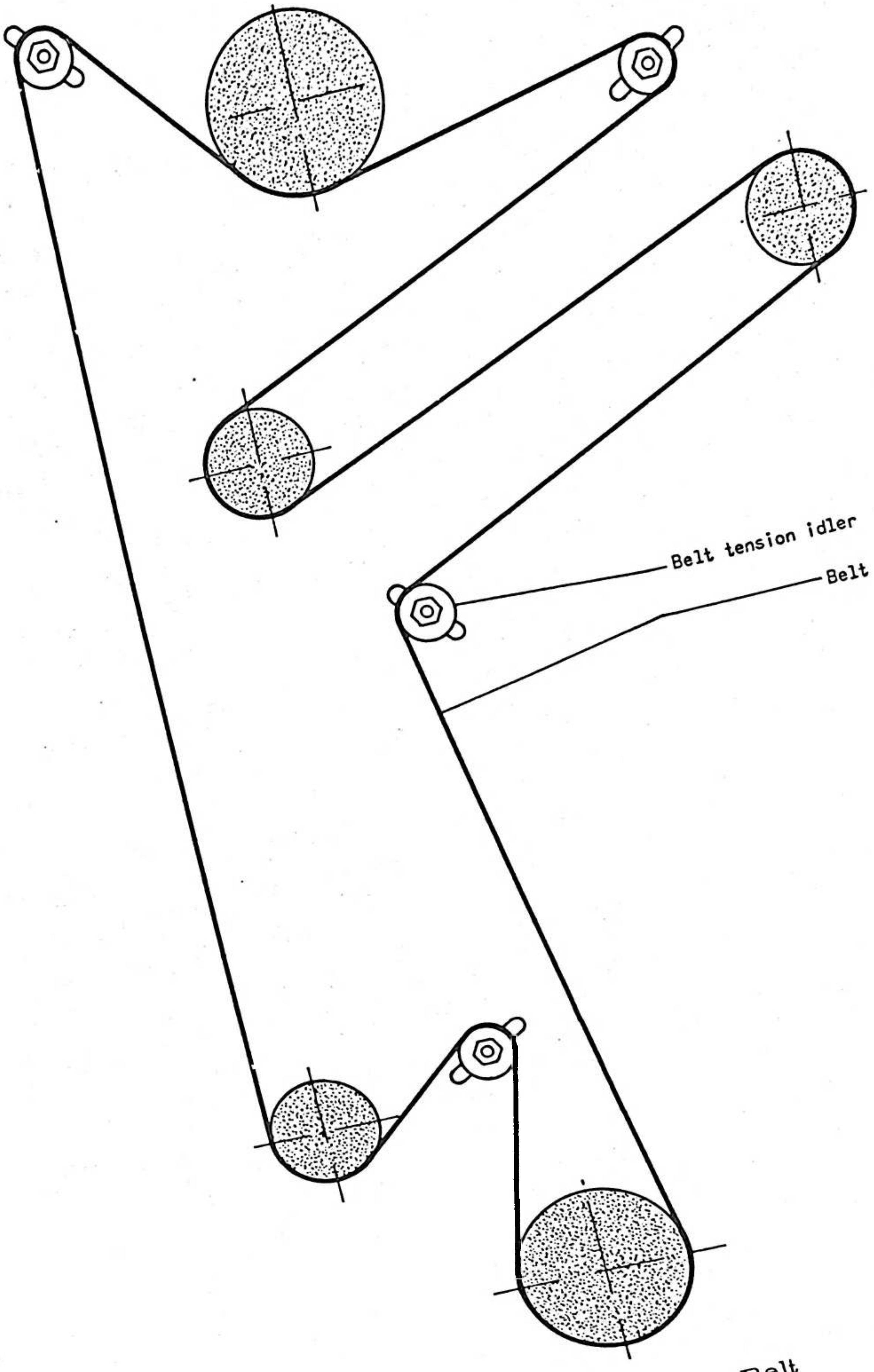


Fig. 4.19. - Drive Belt

5 - FINAL CHECKS

- None.

ROUTINE : 4.20

NAME : READ LAMP VOLTAGE ADJUSTMENT

DURATION : 0.1 h
PREREQUISITES : None

1 - NEEDED MATERIAL

- Multimeter (Metrix)	P.N. 5282624 A
- Multimeter prods	" 5282628 B

2 - PURPOSE

- Ensure correct read lamp supply.

3 - PRELIMINARY CHECKS

- None.

4 - PROCEDURE

1) - Remove the upper left hand cover. See fig. 4.20.

2) - Power up the subsystem.

3) - Set multimeter to 10 V AC range scale and measure the voltage across terminal strip contacts 6 - 7.
The terminal strip is physically located near the elapsed time counter.

4) - Rotate the rheostat adjustment knob to obtain a read lamp supply voltage of $\boxed{5.5 \pm 0.2 \text{ V .}}$

5) - Replace the upper cover.

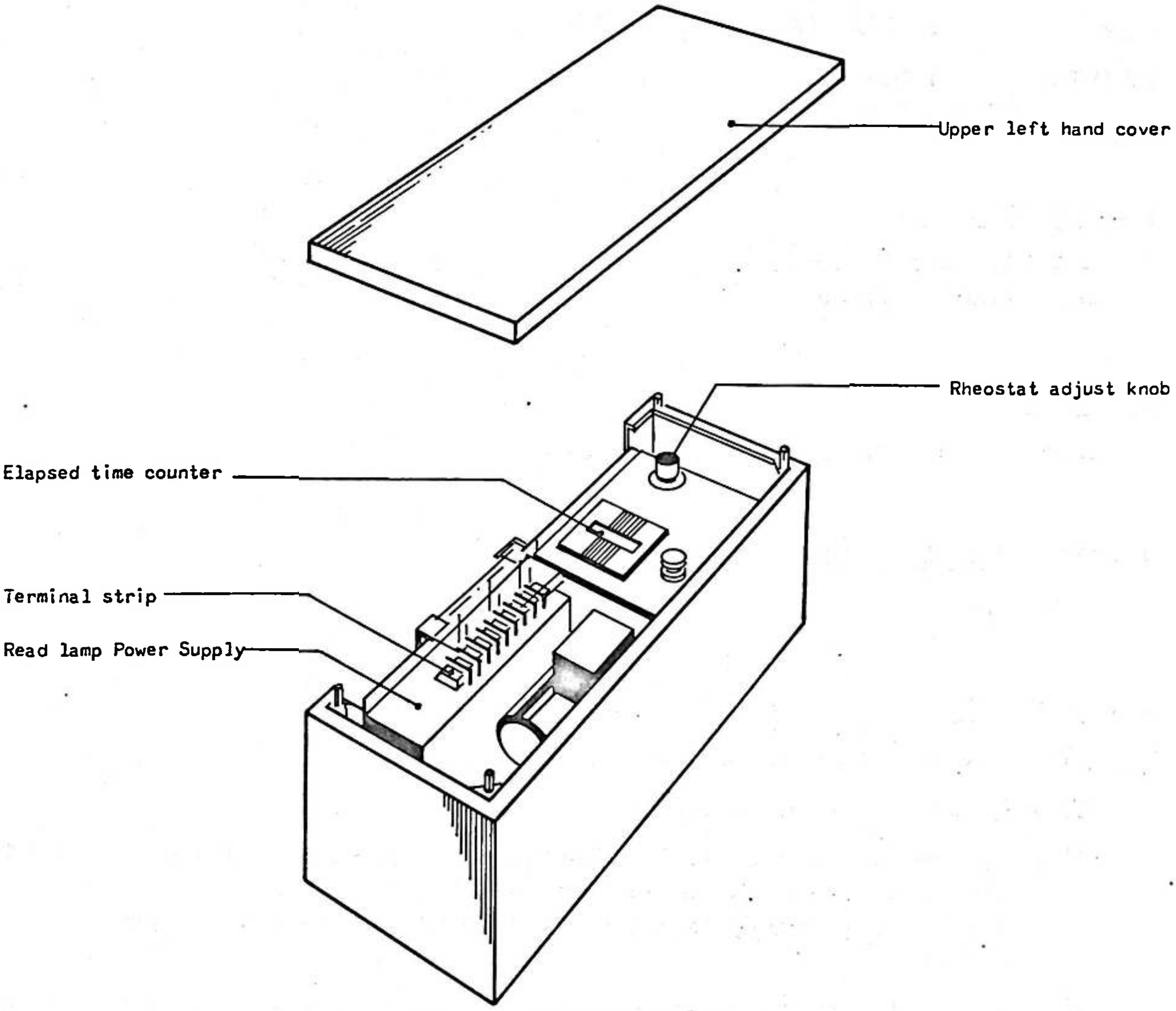


Fig. 4.20. - Read Lamp Power Supply

5 - FINAL CHECKS

- Carry out routine 4.21.

ROUTINE : **4.21**

NAME : READ SIGNALS ADJUSTMENT

DURATION : 0.30 h
PREREQUISITES : Routines 4.20 and 1.1

1 - NEEDED MATERIAL

- Scope
- "Continuous read" punched tape attached to the diagnostics
- General purpose s/driver. P.N. 4355375.

2 - PURPOSE

- Ensure correct read signal timings.

3 - PRELIMINARY CHECKS

- None.

4 - PROCEDURE

1) - Load the full tracks punched tape.

2) - Power up the subsystem.

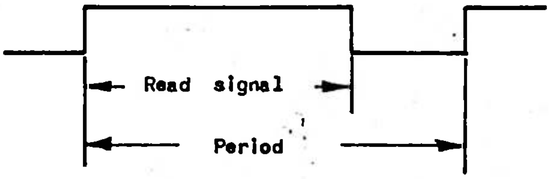
3) - Remove the rear panel to gain access to the electronics module wire up pins.

4) - Connect up the scope as follows :
   - the scope probe to pin 01 - connector 05 - row A,
   - ext. sync,
   - sweep frequency to 200 µs or 500 µs per cm (depending upon type of reader),
   - amplitude to 1 volt per cm.

5) - Command the machine with manual tape advancement.

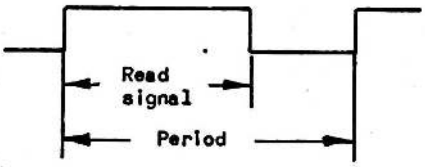
6) - The scope will reveal a waveform that, through opportune adjustment of the AFOT PWB pot, must correspond to the following characteristics.

PTR 101

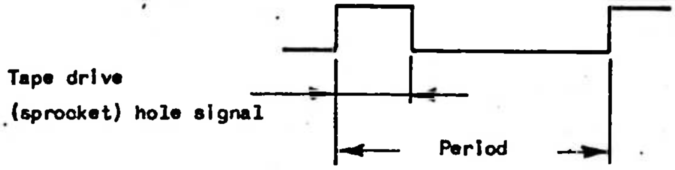


Period = 2.360 ms
Read signal = 1.6 ms ± 50 µs

PTR 100



Period = 2 ms
Read signal = 1.35 ms ± 50 µs



Period = 2 ms
Tape drive hole signal = 0.85 ms ± 50 µs

7) – Connect up the scope on the other read signal pins (pin 1 and 16)of PWBs located in pos. A05 – A06 – A07 – A08 – A09 – A010.
Not all boards will emit signals (depending upon the reader type).

8) – Replace all panels.

5 – FINAL CHECKS

– Feed through the diagnostic to ascertain correct functioning of the subsystem in the read mode.

5. REMOVALS AND REPLACEMENTS

ROUTINE : **5.1**
NAME : MECHANICS GROUP REMOVAL
DURATION : 0.2 h
PREREQUISITES : None

1 – NEEDED MATERIAL

– General purpose s/driver	P.N. 7131845 J
– Socket spanner 11 mm	" 7133704 K

2 – PRELIMINARY CHECKS

– None.

3 – PROCEDURE

1) – Remove the rear subsystem panel.

2) – Disconnect the reader command cable connector, fitted on the cabinet.

3) – Open the covers.

4) – Grasp the group by the two recessed handles and extract.

5) – To replace, follow the removal procedure in the reverse order, paying attention to correctly insert the 4 main deck posts in their pertinent cabinet seats.

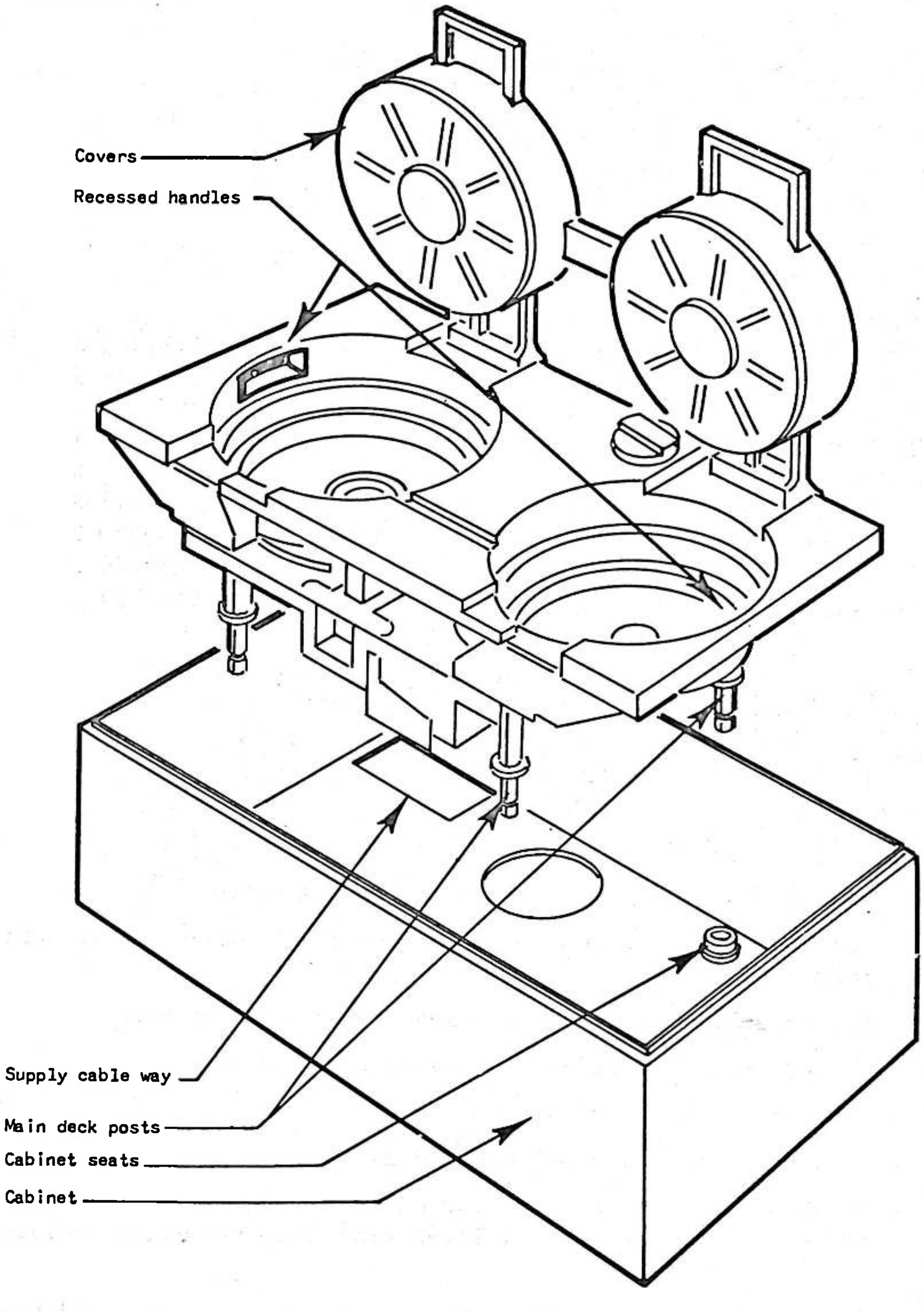


Fig. 5.1. - Reader Mechanics Group

4 - FINAL CHECKS

- None.

ROUTINE : 5.2

NAME : CLUTCH GROUP REPLACEMENT

DURATION : 0.6 h
PREREQUISITES : Routine 5.1.

1 - NEEDED MATERIAL

- General purpose s/driver	P.N.	7131845 J
- Big s/driver	"	7131145 K
- Pliers	"	7137620 A
- Spring hook	"	7135455 T
- Allen key 2 mm	"	7133128 W
- Feeler gauge	"	7257213 E
- Open end wrench 6 mm	"	7133210 Y
- Plastic hammer	"	7136340 S
- Circlip tool	"	7136131 W

2 - PRELIMINARY CHECKS

- None.

3 - PROCEDURE

1) - Remove the two upper clutch disc fixing screws.

2) - Draw out both the upper clutch disc and toothed pulley from the main shaft.

3) - Loosen the pressure pad release lever fixing screw.

4) - Remove the 3 clutch command lever pivot circlips.

5) - Draw out both the pivot and spring.

6) - Remove the pressure pad release lever.

7) - Move the clutch command lever and draw out the brake shoes lever so as to part the command lever pins from the clutch release plate collar.

8) - Extract the lower clutch disc, spring pressure disc and clutch release plate group.

9) - Remove the clutch command lever.

10) - To replace, carry out the removal procedure in the reverse order and implement adjustment procedures 4.11, 4.13 and 4.12.

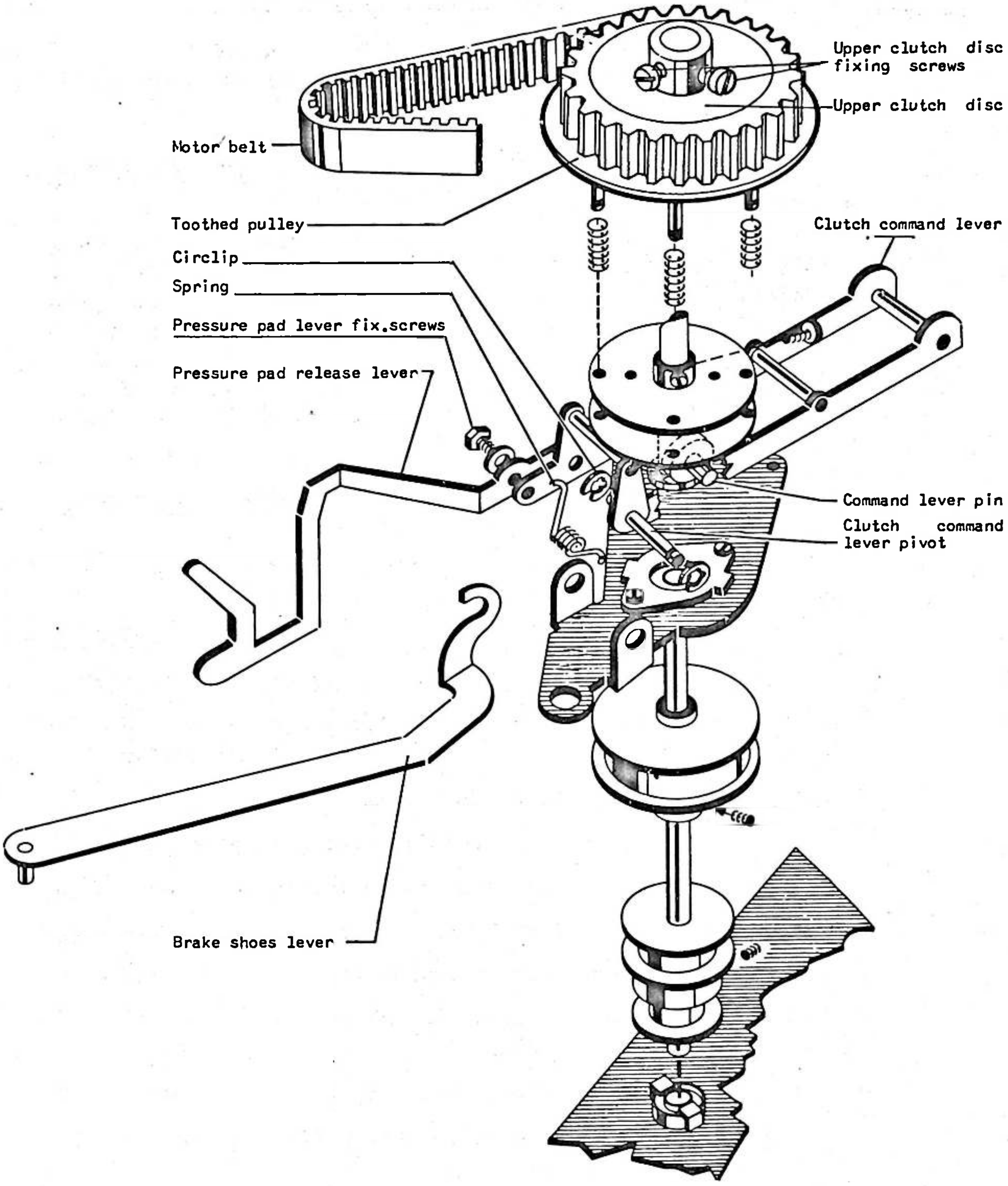

Upper clutch disc fixing screws
Upper clutch disc
Motor belt
Toothed pulley
Clutch command lever
Circlip
Spring
Pressure pad lever fix.screws
Pressure pad release lever
Command lever pin
Clutch command lever pivot
Brake shoes lever

Fig. 5.2. - Clutch Group

4 - FINAL CHECKS

- None.

ROUTINE : 5.3

NAME : DRIVE ROLLERS REPLACEMENT

DURATION : 0.5 h
PREREQUISITES : Routine 5.1.

1 - NEEDED MATERIAL

- General purpose s/driver	P.N.	7131845 J
- Plastic hammer	"	7136340 S
- Socket spanner 6 mm	"	7133645 D
- Socket spanner 8 mm	"	7133670 E
- Spring hook	"	7135455 T
- Circlip tool	"	7136131 W
- Feeler gauge	"	7257213 E
- Allen key 3 mm	"	7133130 Y

2 - PRELIMINARY CHECKS

- None.

3 - PROCEDURE

Driven roller removal

1) - Remove the 4 top outer plate fixing screws, the distance pins and roller shafts.

2) - Remove the upper fixed brake shoe fixing screw.

3) - Remove the top outer plate.

4) - Remove the roller armature circlip.

5) - Release the tension spring from the lower driven roller terminal.

6) - Draw out the armature group from the shaft.

7) - Remove the roller fixing screw, nut and washer, from the pertinent shaft.

8) - Draw out the driven roller shaft.

9) - Remove the roller and pertinent armature cover.

Driven roller replacement

- To replace, carry out the above described removal sequence in the reverse order.

Drive roller removal

1) - Remove the three top inner plate fixing screws, the distance pins and movable brake shoe shaft.

2) - Remove the two drive roller cover look nuts.

3) - Release the movable brake shoe tension spring.

4) - Remove the top inner plate.

5) - Remove the drive roller covers.

6) - Remove the drive belt.

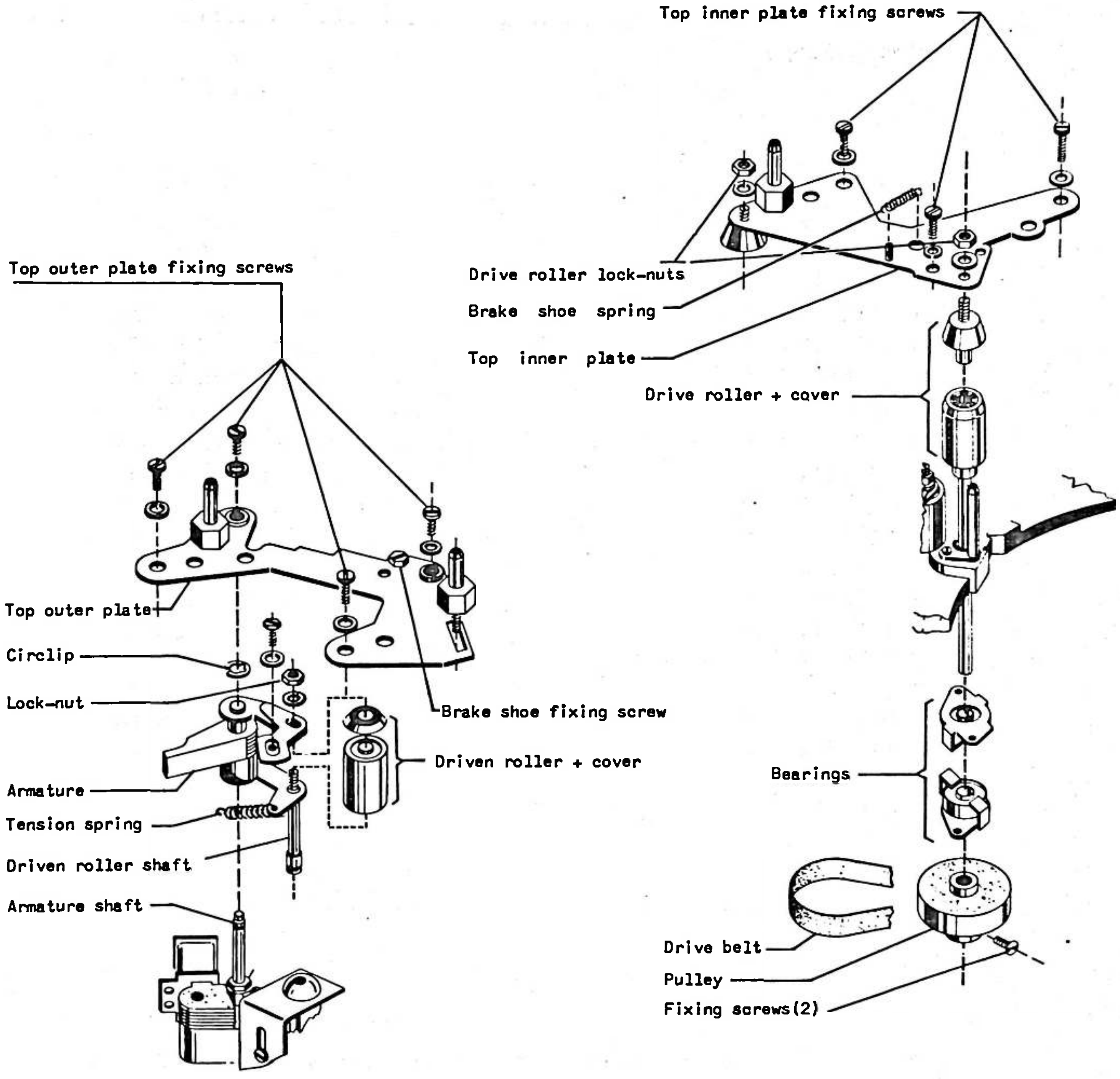
7) - Loosen the two fixing screws and draw out the pulley.

8) - Press on the roller shaft to withdraw it from its rotation housing (bearings).

Drive roller replacement

- To replace, carry out the above described removal operations in the reverse order' paying careful attention to fully insert the drive roller, shaft and pulley in their bearings.

Upon completion of replacement operations, implement adjustment routines 4.4. and 4.5.



b) - Drive Roller

a) - Driven Roller

Fig. 5.3. - Drive Rollers Group

4 - FINAL CHECKS

- Check that the drive belt is mounted with its fibre surface facing the drive pulley.

ROUTINE : 5.4

NAME : BRAKE SHOES REPLACEMENT

DURATION : 0.3 h
PREREQUISITES : None

1 – NEEDED MATERIAL

– Small s/driver	P.N.	4355475 P
– General purpose s/driver	"	7131845 J
– Big s/driver	"	7131145 K
– Allen key 3 mm	"	7133130 Y
– Allen key 4 mm	"	7133140 Z
– Allen key 5 mm	"	7133150 S
– Open end wrench 7 mm	"	7133210 Y
– Open end wrench 12 mm	"	7133250 U
– Spring hook	"	7135455 T
– Circlip tool	"	7136131 W
– Pliers	"	7137620 A
– Tweezers	"	7237379 U
– Plastic hammer	"	7136340 S
– Scissors	"	7136461 F
– Socket spanner 6 mm	"	7133645 D
– Socket spanner 7 mm	"	7133665 F
– Socket spanner 8 mm	"	7133670 E
– Feeler gauge	"	7257213 E

2 – PRELIMINARY CHECKS

– None.

3 – PROCEDURE

Fixed brake shoe removal

1) – Remove the 4 top outer plate fixing screws.

2) – Remove the upper fixed brake shoe fixing screw.

3) – Remove the outer plate.

4) – Remove the two fixed shoe fixing screws and hence the brake shoe.

Fixed brake shoe replacement

- To replace, carry out the above described removal sequence in the reverse order.

Movable brake shoe removal

1) - Remove the 3 top inner plate fixing screws.
2) - Remove the drive roller cover lock-nuts.
3) - Release the movable shoe tension spring.
4) - Remove the inner plate.
5) - Remove the pressure pad release lever.
6) - Withdraw the shoe shaft circlip.
7) - Remove the shoe-armature group from the shaft.

Movable brake shoe replacement

- To replace, carry out the above described removal operations in the reverse order.

> **Note**
>
> Once the replacement procedure has been completed, implement adjustment routines 4.2. and 4.3.

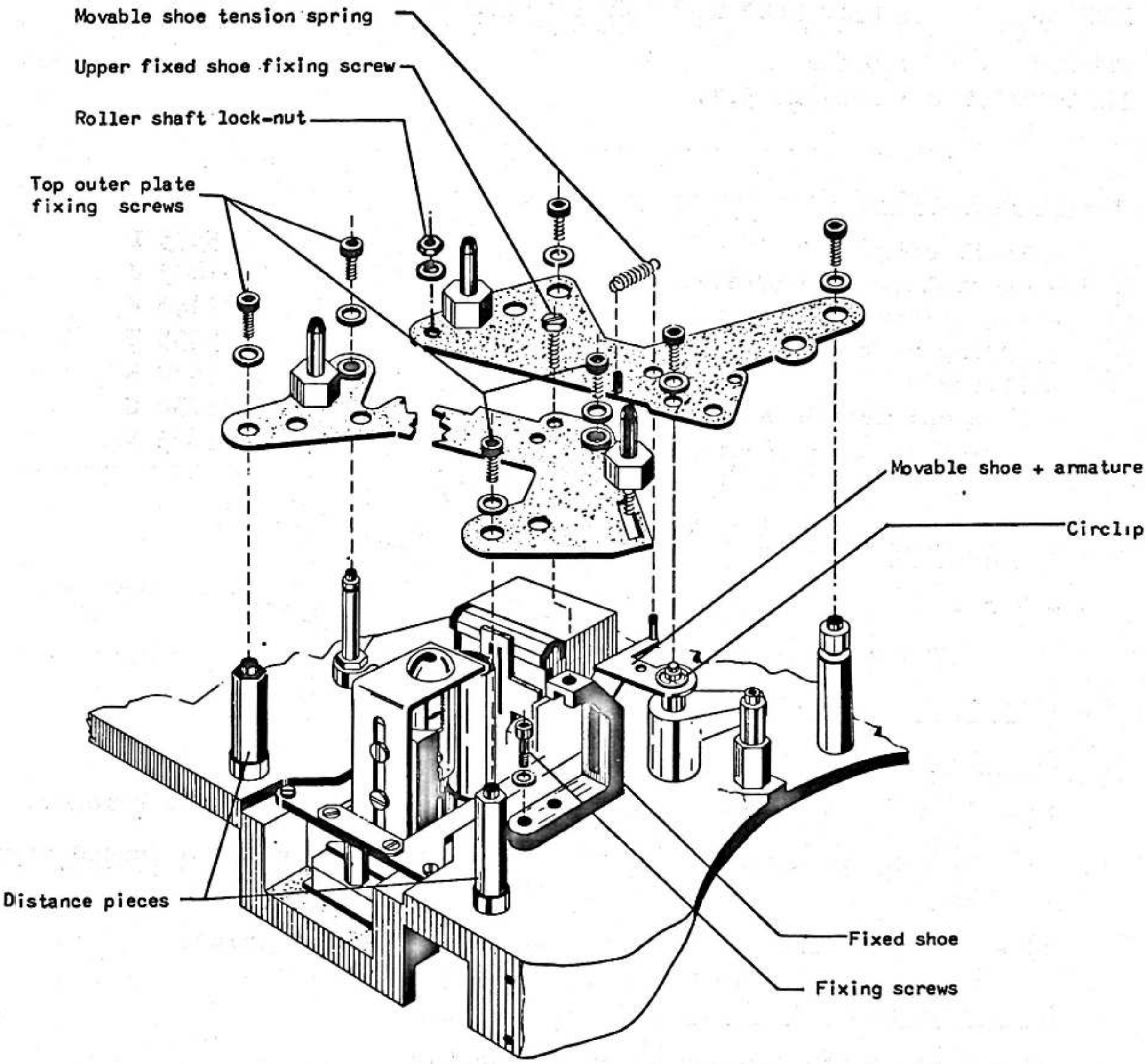


Fig. 5.4. - Brake Shoes Group

4 - FINAL CHECKS

- None.

ROUTINE : 5.5

NAME : READ HEAD GROUP REPLACEMENT

DURATION : 0.6 h
PREREQUISITES : Routine 5.1.

1 - NEEDED MATERIAL

- Small s/driver	P.N. 4355475 P
- General purpose s/driver	" 7131845 J
- Big s/driver	" 7131145 K
- Spring hook	" 7135455 T
- Pliers	" 7137620 A
- Open end wrench 9 mm	" 7133230 S
- Socket spanner 7 mm	" 7133665 F

2 - PRELIMINARY CHECHS

- None.

3 - PROCEDURE

Read lamp removal

1) - Loosen the lamp bracket fixing screws and remove the bracket.
2) - Loosen the lamp wire lug lock-nuts and draw out the forced terminal lugs.
3) - Twist the lamp within its socket and hence extract.

Read head removal

1) - Release the tape pressure pad spring.
2) - Loosen the screws located on the head base.
3) - Remove the head cover.
4) - Remove the rear plate fixing screws and hence the plate.
5) - Remove the 2 read head side screws.
6) - Extract the protective glass and head screen.

Head group replacement

- To replace, carry out the described removal sequence in the reverse order paying careful attention to insert the lamp with its filament facing the photocells.

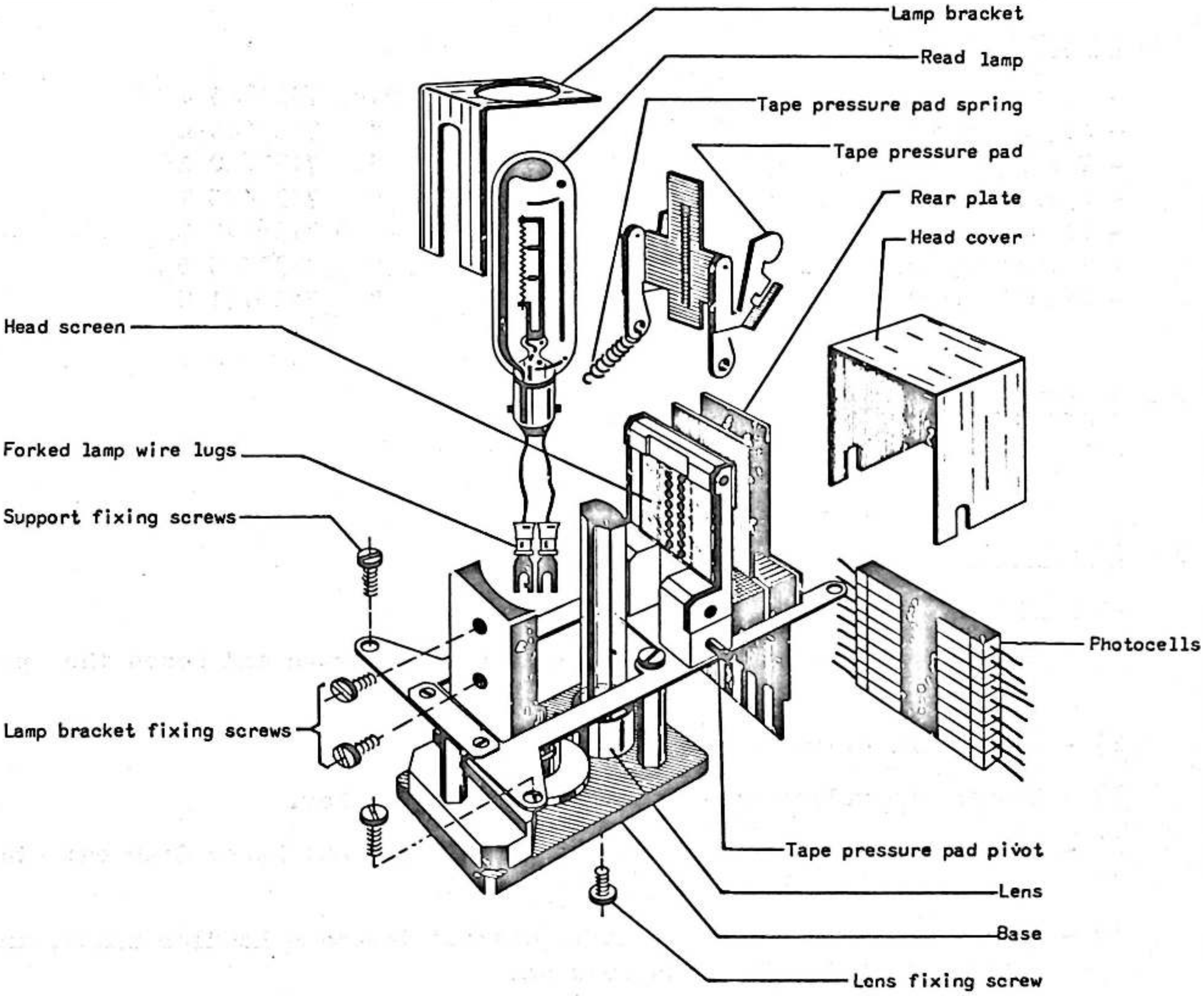


Fig. 5.5. - Read Head Group

4 - FINAL CHECKS

- Check the read amplifiers threshold voltage.

ROUTINE : 5.6

NAME : TAPE HANDLER PLATES REPLACEMENT

DURATION : 0.3 h
PREREQUISITES : Routine 5.1.

1 - NEEDED MATERIAL

- General purpose s/driver	P.N.	7131845 J
- Big s/driver	"	7131145 K
- Pliers	"	7137620 A
- Spring hook	"	7135455 T
- Plastic hammer	"	7136340 S
- Socket spanner 5 mm	"	7133205 D
- Circlip tool	"	7136131 W

2 - PRELIMINARY CHECKS

- None.

3 - PROCEDURE

Right hand plate

1) - Remove the 4 right hand side panel fixing screws and hence the panel.

2) - Remove the drive belt.

3) - Loosen the pulley screws and extract the pulley.

4) - Remove the right hand tension idler circlip and hence draw out the idler from its shaft.

5) - Moving the tension idler shaft, extract the tape handler plate, and pertinent shaft, from its housing.

Plate clutch removal

1) - Remove the hub support circlip.

2) - Release the clutch disc spring and hence extract the two lining discs.

Group replacement

- To replace, carry out the described removal sequence in the reverse order and implement adjustment routine 4.1.

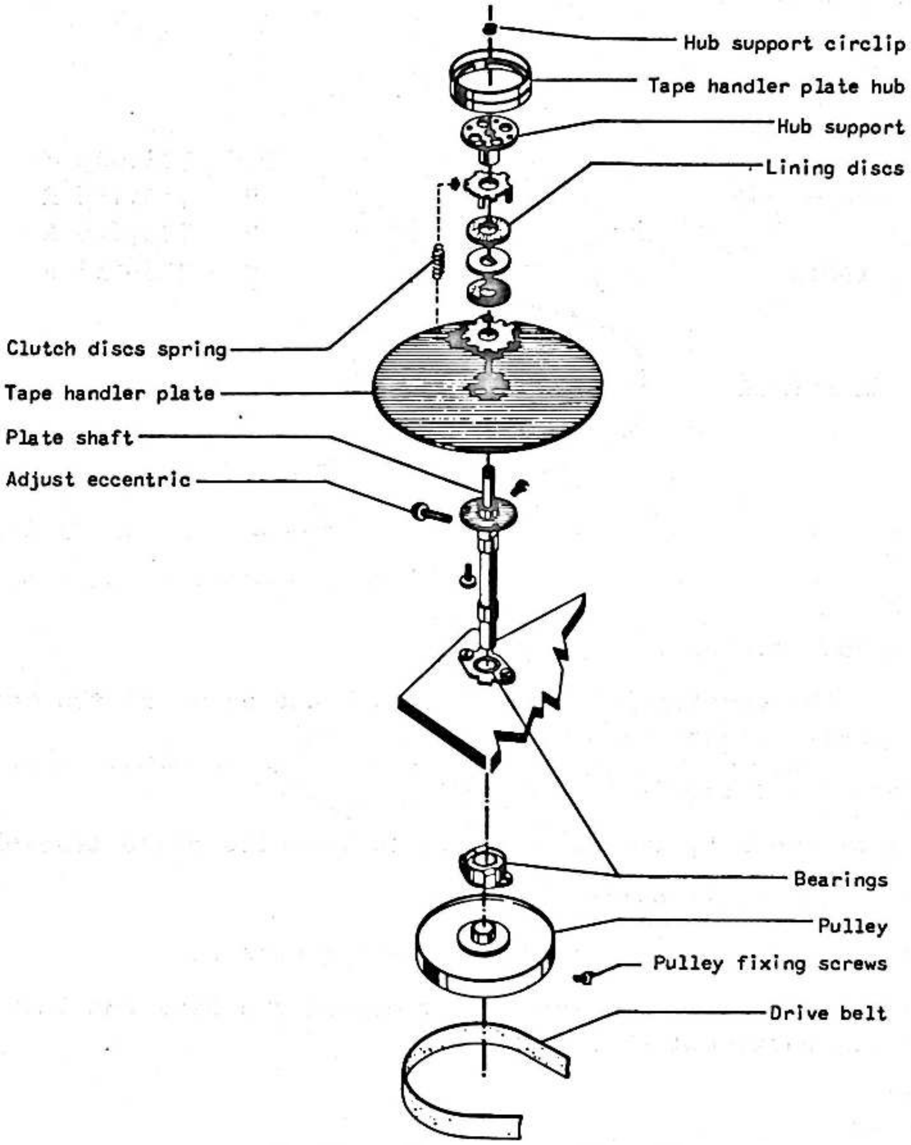


Fig. 5.6. - Tape Handler Plate Group

4 - FINAL CHECKS

- Ensure that the drive belt is mounted with its fibre surface facing the drive pulley.

ROUTINE : 5.7

NAME : COUNTER-PLATES REPLACEMENT

DURATION : 0.2 h
PREREQUISITES : None

1 - NEEDED MATERIAL

- General purpose s/driver	P.N. 7131845 J
- Big s/driver	" 7131145 K
- Pliers	" 7137620 A
- Circlip tools	" 7136131 W

2 - PRELIMINARY CHECKS

- None.

3 - PROCEDURE

Removal

1) - Open the covers.

2) - Remove the counterplate circlip and hence draw out the assembled hub and pertinent counterplate.

3) - Remove the 3 hub fixing screws.

4) - Extract the hub, taking care not to loose the plate tension springs.

5) - Remove the small outer lid.

6) - Remove the 4 rotation rod/plate fixing screws.

7) - Remove the 5 plastic disc fixing screws and draw out both the disc and its pertinent shaft.

Replacement

- To replace, carry out the above removal operations in the reverse order and hence implement adjustment routine 4.14.

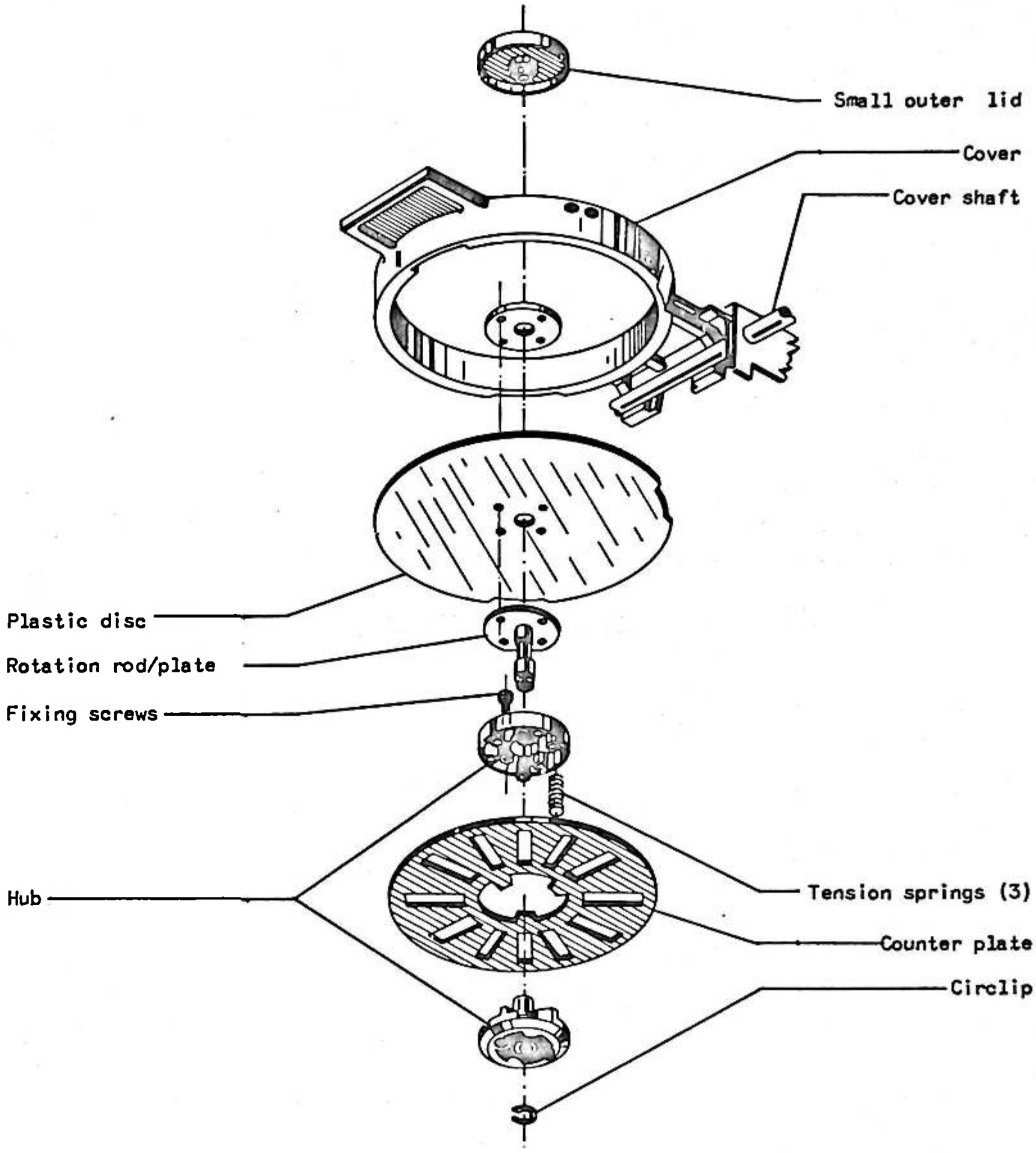


Fig. 5.7. – Counter-plate Group

4 – FINAL CHECKS

– None.

6. MAINTENANCE AIDS

ROUTINE : 6.1
NAME : PUNCH CHECK GAUGE
DURATION :
PREREQUISITES :

1 - NEEDED MATERIAL

- 6 square holes template	P.N. 6455156 D
- 5 round holes template	" 6455157 D
- 6 round holes template	" 4371783 E
- 7-8 round holes template	" 6455158 D

2 - PURPOSE

- Ensure correct usage of the punch pitch gauge.

3 - PRELIMINARY CHECKS

- None.

4 - PROCEDURE

- Insert a length of punched tape between the two pertinent gauge templates so as to axially center the hole with the 1st template reference. Hence check that the 50th hole falls within the given 2nd template reference tolerances.

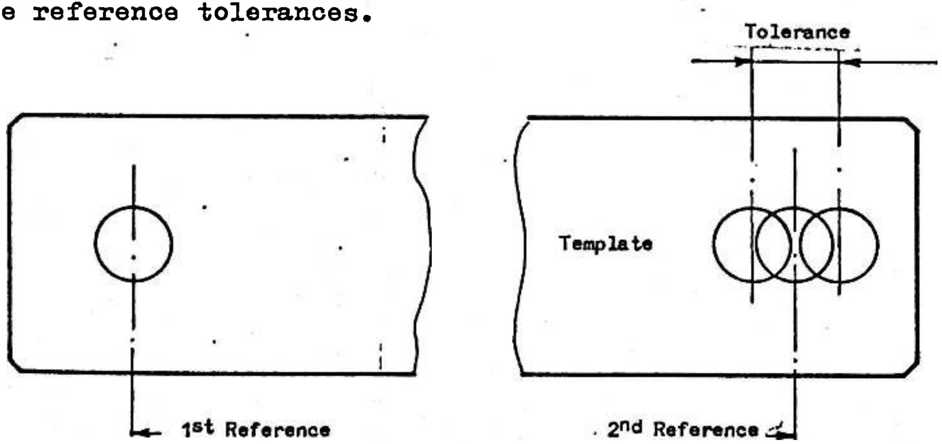


Fig. 6.1. - Punch Pitch Gauge

4 - FINAL CHECKS

- None.

PREVENTIVE MAINT. LOG

PTR 100-101

YEAR MACHINE TYPE AND SERIAL No.

MAINTENANCE TYPE **G** Approx. duration 0.8 h.h/10		
FREQ.	3 months	4 months
SHIFTS	3	1-2

SCHED. DATE	EFFECT. DATE	EFFECT. DURAT.	ENGR.

MAINTENANCE TYPE **H** Approx. duration 2.5 h.h/10		
FREQ.	6 months	Annual
SHIFTS	2-3	1

SCHED. DATE	EFFECT. DATE	EFFECT. DURAT.	ENGR.

PIECE	REPL. FREQ. (hours)	SCHEDULED REPLACEMENTS					

DATE	NOTES

Mod. 0146

GENERAL ELECTRIC
GENERAL ELECTRIC INFORMATION SYSTEMS ITALIA

MAINTENANCE SCHEDULE TYPE G

PTR 100-101

MACHINE OFF OPERATIONS

1. GENERAL CLEANING

a) - Read the notes listed on the Preventive Maintenance Log
b) - Proceed to clean :
  - all accessable reader parts
  - read head, lens, tape pressure pad (1.1)
  - drive rollers (1.1)

2. CHECKS

a) - Check drive rollers parallelism and clearance (2.1)
b) - Check driven rollers vertical play (2.1)

MACHINE ON OPERATIONS

3. TAPE DRIVE GROUP

Check :
a) - brake shoes alignment (2.1)
b) - for correct clutch action (insertion and release) (2.3)

4. FINAL OPERATIONS

a) - Check for correct tape feeding and tape packing operations (2.2)
b) - Check read signals timing (4.21)
c) - Fill in the Preventive Maintenance Log.

NOTE

Reference numbers in brackets refer to paragraphs of Maintenance Manual P.N. 4.840.4.001/A.
The pertinent Preventive Maintenance Log has P.N. 4.033.4.019.3/A

MAINTENANCE SCHEDULE TYPE H

PTR 100-101

SPECIAL TOOLS	• check pads jig	P.N. 4355270 C
	• 6 square holes template	P.N. 4355272 N
	• 5+1 round holes template	P.N. 4355271 A
	• 8+1 round holes template	P.N. 4355273 J
	• 6+1 round holes template	P.N. 4355274

MACHINE OFF OPERATIONS

1. CLEANING

a) - Read the notes listed on the Preventive Maintenance Log
b) - Extract the mechanics group (5.1)
c) - Proceed to clean :
  - read head, lens, tape pressure pad (1.1)
  - drive rollers (1.1)

2. LUBRICATION

Lubricate as per Lubrication Plan :
a) - drive group mechanism (3.4)
b) - wind group components (3.5)
c) - clutch group components (3.6)
d) - speed change group parts (3.7)
e) - arms exclusion group (3.8)
f) - photoreader group (3.3)

3. CHECKS

Check :
a) - drive rollers parallelism and clearance (2.1)
b) - driven rollers vertical play (2.1)
c) - for correct clutch gap (2.3)
d) - motor and speed change belt state of wear(2.4)
Replace the mechanics group (5.1)

MACHINE ON OPERATIONS

4. TAPE DRIVE GROUP

Check :
a) - brake shoes alignment (2.1)
b) - for correct clutch operation (insertion and release) (2.3)

5. FUNCTIONAL CHECKS

Check :
a) - for correct tape feeding and packing operations (2.2)
b) - read signals (4.2)
c) - skew and jitter (2.6 - 2.7)

6. FINAL OPERATIONS

a) - feed through the diagnostic tests
b) - fill in the Preventive Maintenance Log.

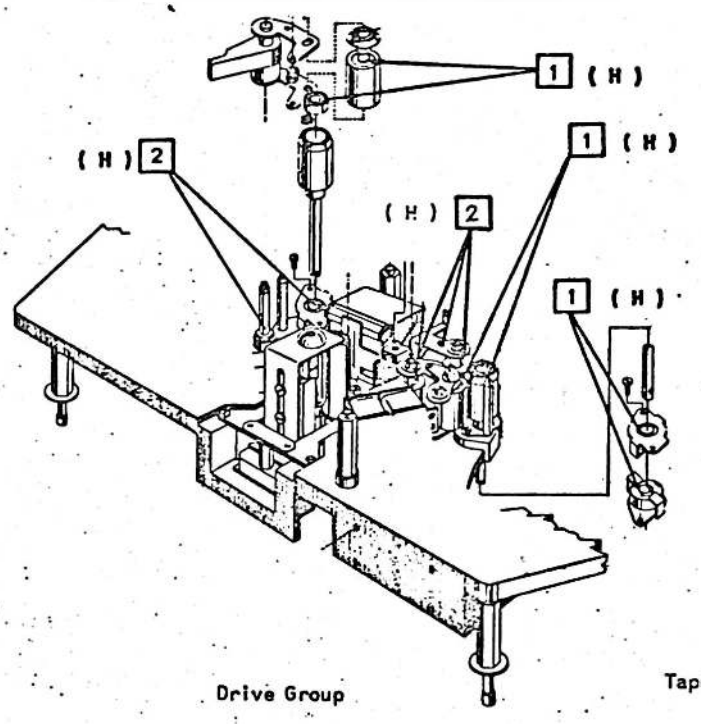
NOTE

Reference numbers in brackets refer to paragraphs of Maintenance Manual P.N. 4.840.4.001/A.
The pertinent Preventive Maintenance Log has P.N. 4.033.4.019.3/A.

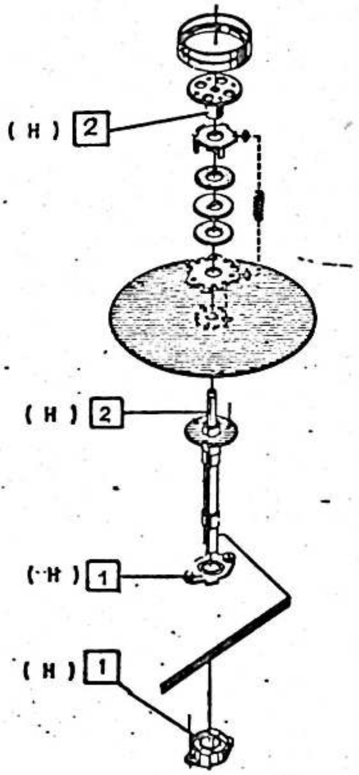
LUBRICATION PLAN

PTR 100-101

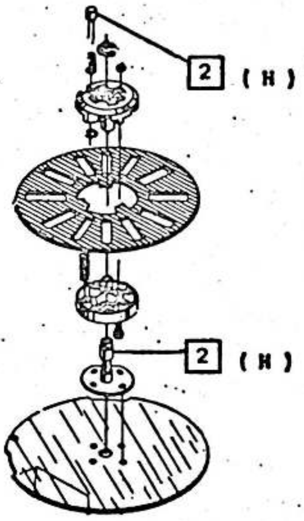
LUBRICANT TYPE			
	③	Medium oil	P.N. 0491020 G
	1	Multi-purpose grease	P.N. 0491014 D
	2	Fibrous grease	P.N. 0491017 R



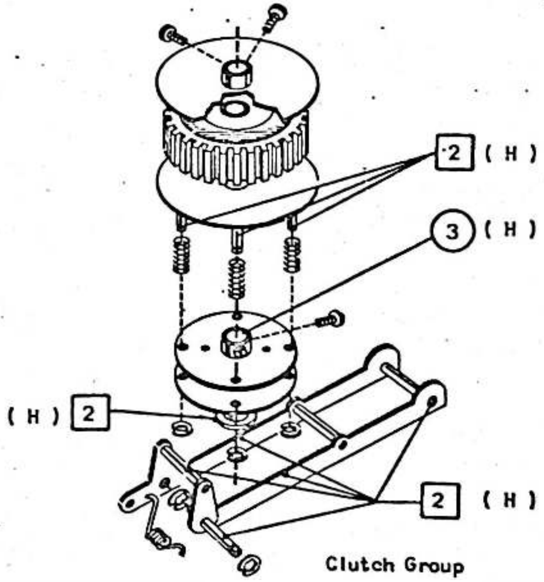
Drive Group



Tape wind group



Tape wind Group



Clutch Group

NOTE

Letters in brackets refer to the pertinent Maintenance Schedule.

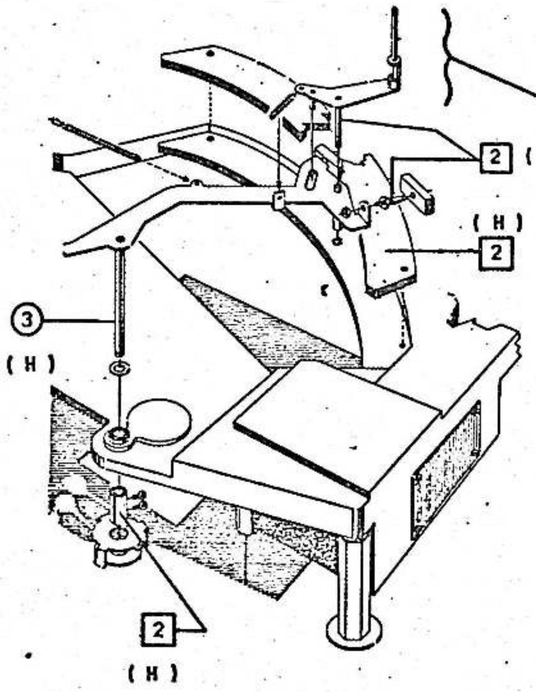
Standard lubricants have been foreseen.

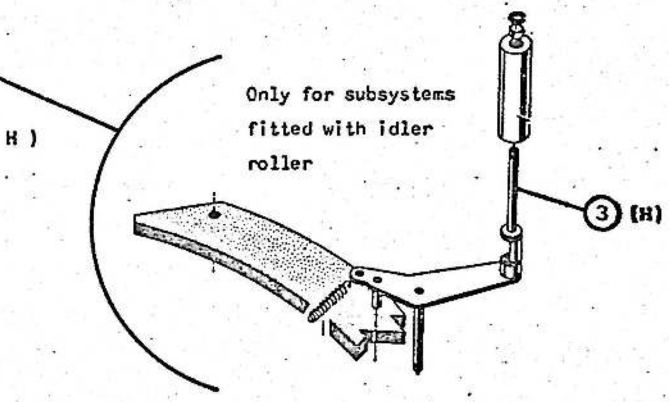
Quantity : ○ ☐ = little ◎ ⧈ = average

LUBRICATION PLAN

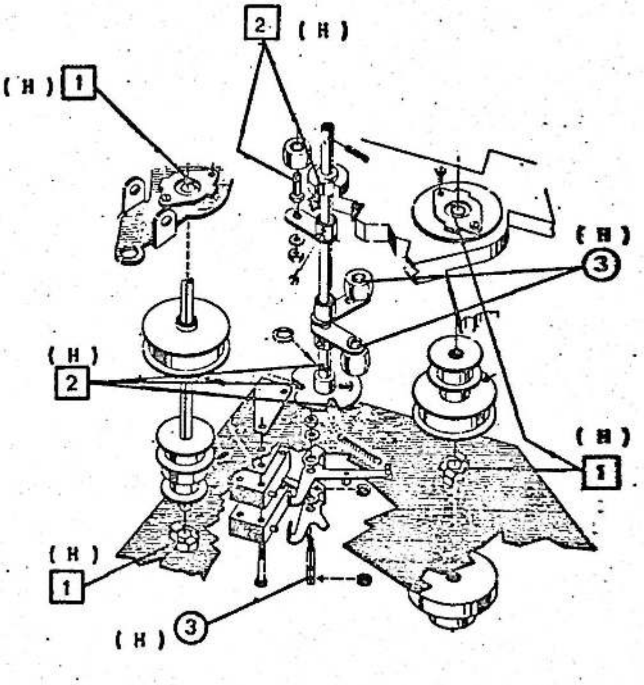
PTR 100-101

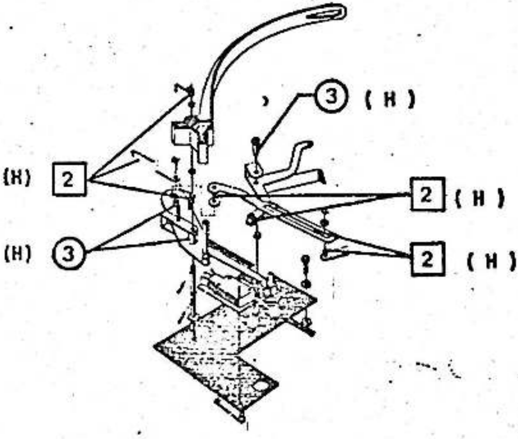
LUBRICANT TYPE	③	Medium oil	P.N.	0491020 G
	[1]	Multi-purpose grease	P.N.	0491014 D
	[2]	Fibrous grease	P.N.	0491017 R





Tape Wind Group





Arms Group

Speed Change Group

NOTE

Letters in brakets refer to the pertinent Maintenance Schedule.
Standard lubricants have been foreseen.
Quantity : ○ □ = little ◎ ▣ = average

PARTS

FOTOLETTORE 400/500

(Catalogo Parti di Ricambio)

Riferimenti			Pagina	Contenuto	Codice		Agg.	
Capitolo	Sottocap.	Paragrafo						
			I	TITOLO	4.840.5.001	0		
			III	INDICE	4.840.5.002	0	1	2
			IV	INDICE	4.840.5.003	0	1	2
			V	TAVOLA DI RIFERIMENTO	4.840.5.004	0		
			VI	" " "	4.840.5.005	0		
			VII	" " "	4.840.5.006	0		
			1	FOTOLETTORE 400/500	4.840.5.007	0		
				MIB 411				
			2	TESTINA 6 FORI QUADRI (figura)	4.840.5.008	0		
			3	" " " "	4.840.5.009	0		
			4	" " " " (figura)	4.840.5.010	0		
			5	" " " "	4.840.5.011	0		
				MIB 412				
			6	TESTINA 5+1 FORI TONDI (figura)	4.840.5.012	0		
			7	" " " "	4.840.5.013	0		
			8	" " " " (figura)	4.840.5.014	0		
			9	" " " "	4.840.5.015	0		
			10	TESTINA 8+1 FORI TONDI (figura)	4.840.5.016	0		
			11	" " " "	4.840.5.017	0		
			12	" " " " (figura)	4.840.5.018	0		
			13	" " " "	4.840.5.019	0		
				MIB 410				
			14	MOBILE ELEMENTARE (figura)	4.840.5.020	0		
			15	" "	4.840.5.021	0		
			16	COPERCHI PREMIBANDA (figura)	4.840.5.022	0		
			17	" "	4.840.5.023	0		
			18	" " (figura)	4.840.5.024	0		
			19	" "	4.840.5.025	0		
			20	BANCALE E PIATTI PORTABANDA (figura)	4.840.5.026	0		
			21	" " " "	4.840.5.027	0		
			22	TRASCINAMENTO BANDA (figura)	4.840.5.028	0	1	
			23	" "	4.840.5.029	0		
			24	" " (figura)	4.840.5.030	0	1	
			25	" "	4.840.5.031	0		
			26	MOTORE - CAMBIO VELOCITA' (figura)	4.840.5.032	0		
			27	" " "	4.840.5.033	0	1	
			28	" " " (figura)	4.840.5.034	0		
			29	" " "	4.840.5.035	0		
			30	LEVISMI BOBINA DESTRA (figura)	4.840.5.036	0		
			31	" " "	4.840.5.037	0		

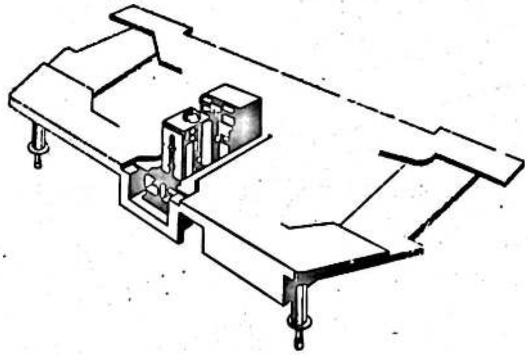
INDICE

Capitolo	Sottocap.	Paragrafo	Pagina	Contenuto	Codice		Agg.
			32	LEVISMI BOBINA DESTRA (figura)	4.840.5.038	0	
			33	" " "	4.840.5.039	0	
			34	LEVISMI BOBINA SINISTRA (figura)	4.840.5.040	0	
			35	" " "	4.840.5.041	0	
			36	" " " (figura)	4.840.5.042	0	
			37	" " "	4.840.5.043	0	
			38	FILTRO - CONNETTORI (figura)	4.840.5.044	0	
			39	" "	4.840.5.045	0	1
				ATA 020/021/022			
			40	ATTUAZIONE (figura)	4.840.5.046	0	
			41	"	4.840.5.047	0	
			42	" (figura)	4.840.5.048	0	
			43	"	4.840.5.049	0	
			44	" (figura)	4.840.5.050	0	
			45	"	4.840.5.051	0	
				TAV 020			
			46	PANNELLO COMANDI (figura)	4.840.5.052	0	
			47	" "	4.840.5.053	0	
				VAR 430			
			48	GRUPPO VENTILAZIONE (figura)	4.840.5.054	0	
			49	" "	4.840.5.055	0	1
				CON 301			
			50	CARROZZERIA (figura)	4.840.5.056	0	1
			51	"	4.840.5.057	0	1
			52	" (figura)	4.840.5.058	0	1
			53	"	4.840.5.059	0	1
				CON 300			
			54	ALIMENTATORE LAMPADA (figura)	4.840.5.060	0	
			55	" "	4.840.5.061	0	1
				GIB 410			
			56	GOVERNO FL FORI QUADRI - VALIDA FINO A O.M. 4000/70	4.840.5.062	0	
				GIB 420			
			57	GOVERNO FL FORI TONDI - VALIDA FINO A O.M. 4000/71	4.840.5.063	0	

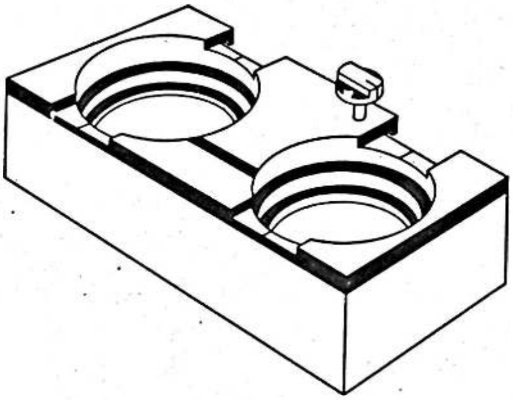
GENERAL ELECTRIC
Servizio Tecnico

TAVOLA DI RIFERIMENTO

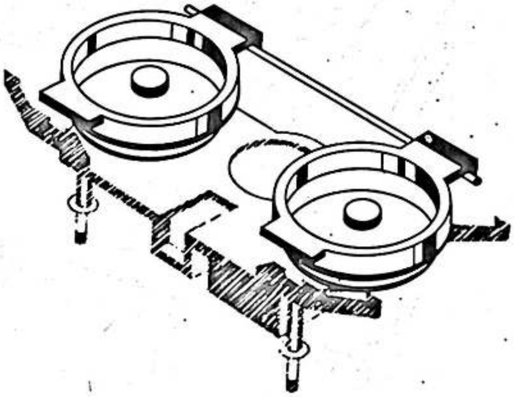
FL 400/500 | P. V
Catalogo PR.



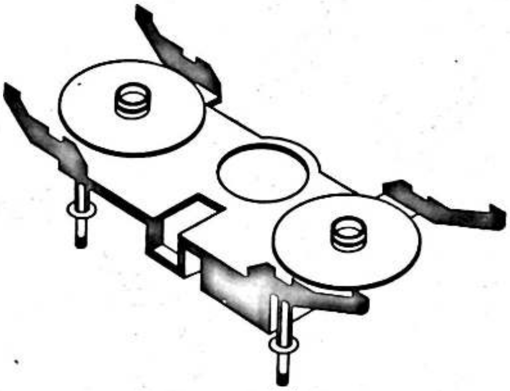
Pagine 2-4-6-8



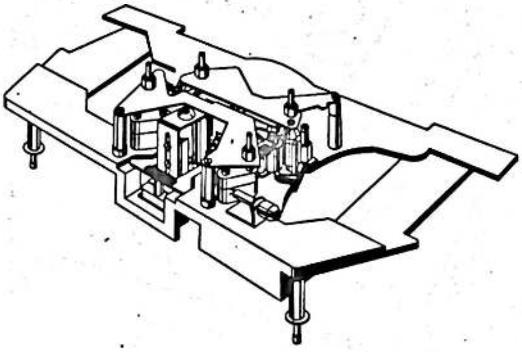
Pagine 10-12



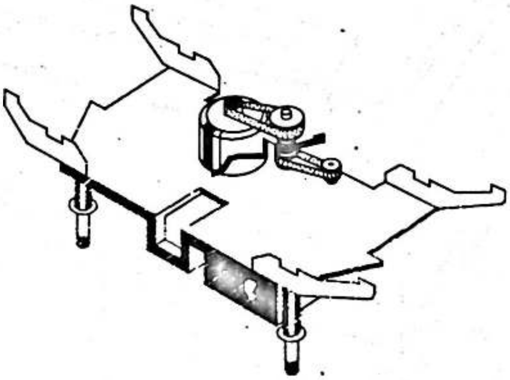
Pagina 14



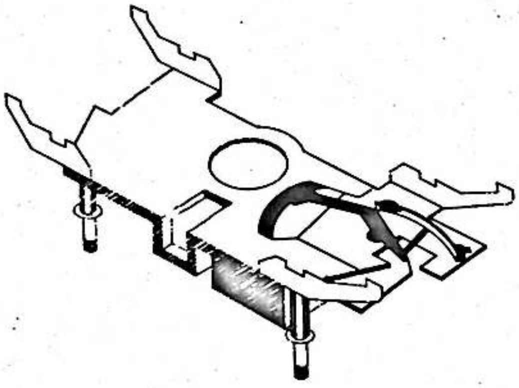
Pagine 16-18



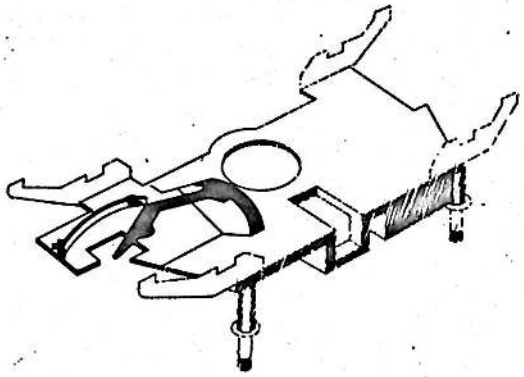
Pagina 20



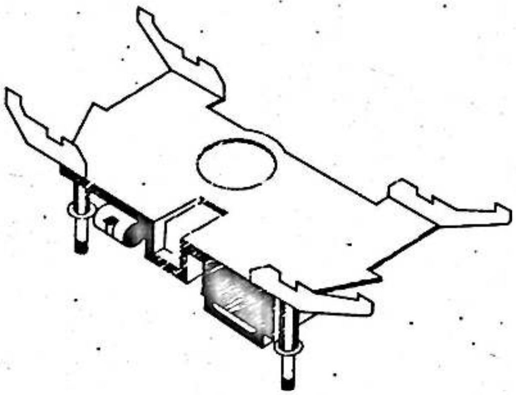
Pagine 22-24



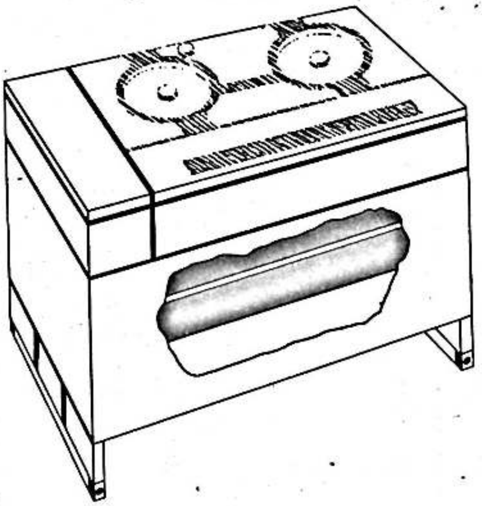
Pagine 26-28



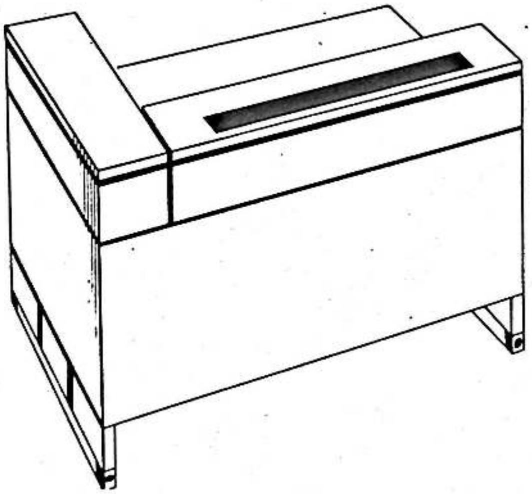
Pagine 30-32



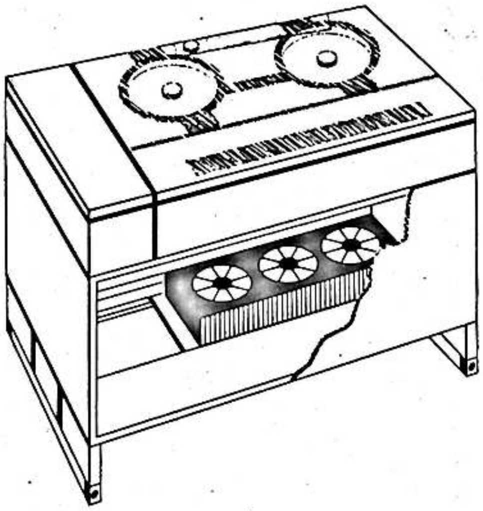
Pagine 34-36



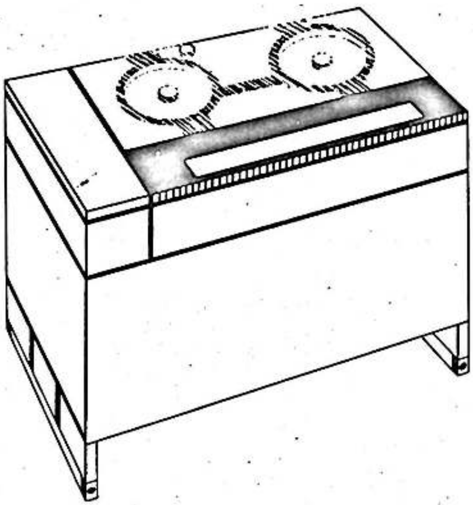
Pagina 38



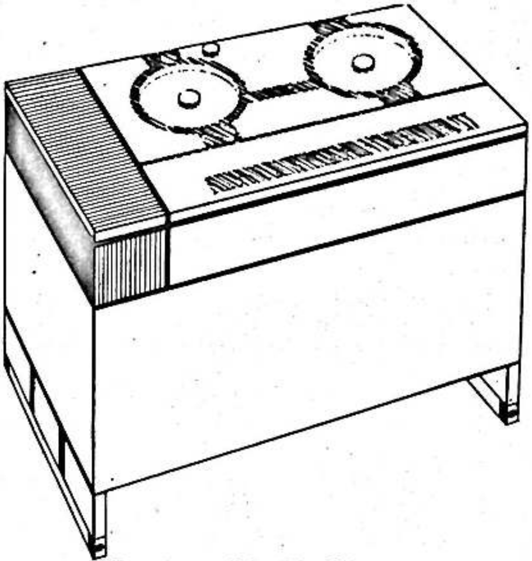
Pagine 40-42-44



Pagina 46

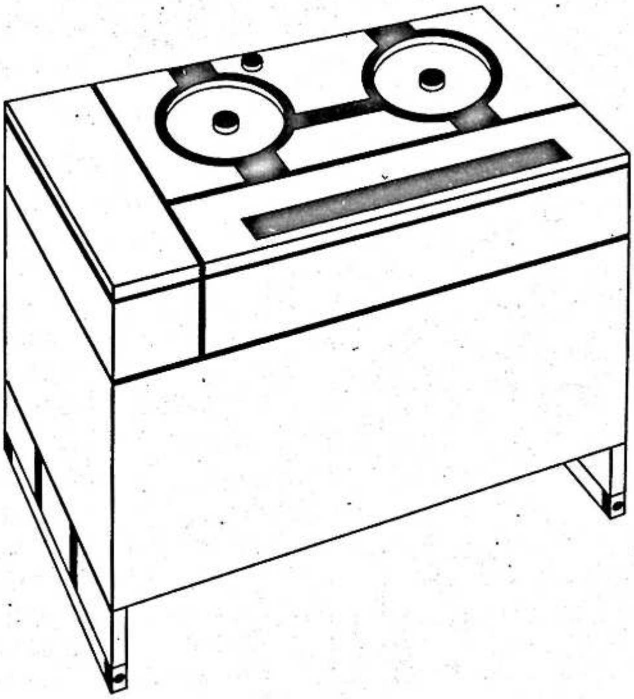


Pagina 48

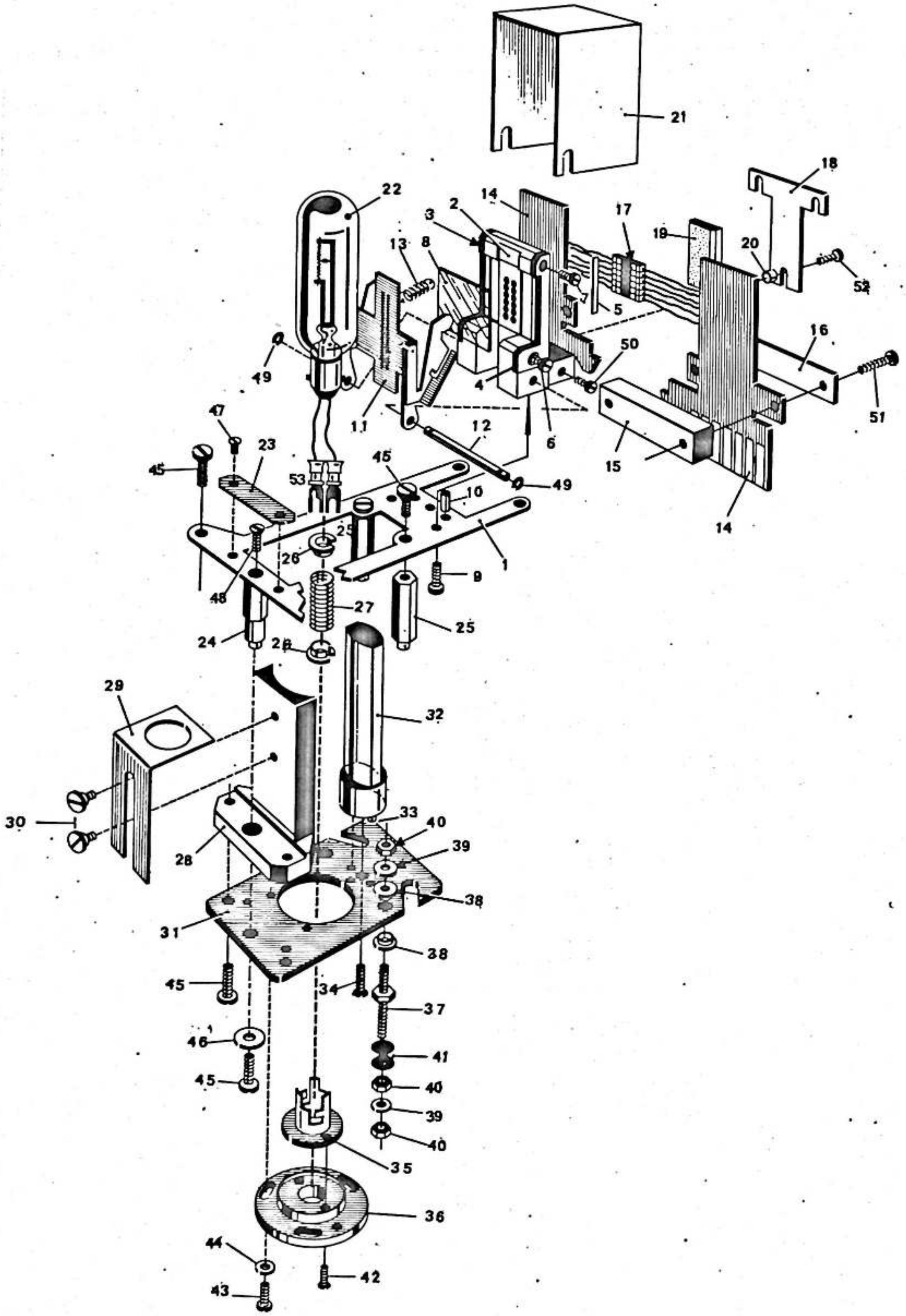


Pagine 50-52-54

FOTOLETTORE 400/500



GENERAL ELECTRIC *Servizio Tecnico*	TESTINA 6 FORI QUADRI	FL 400/500	P. 2
		Catalogo PR.	



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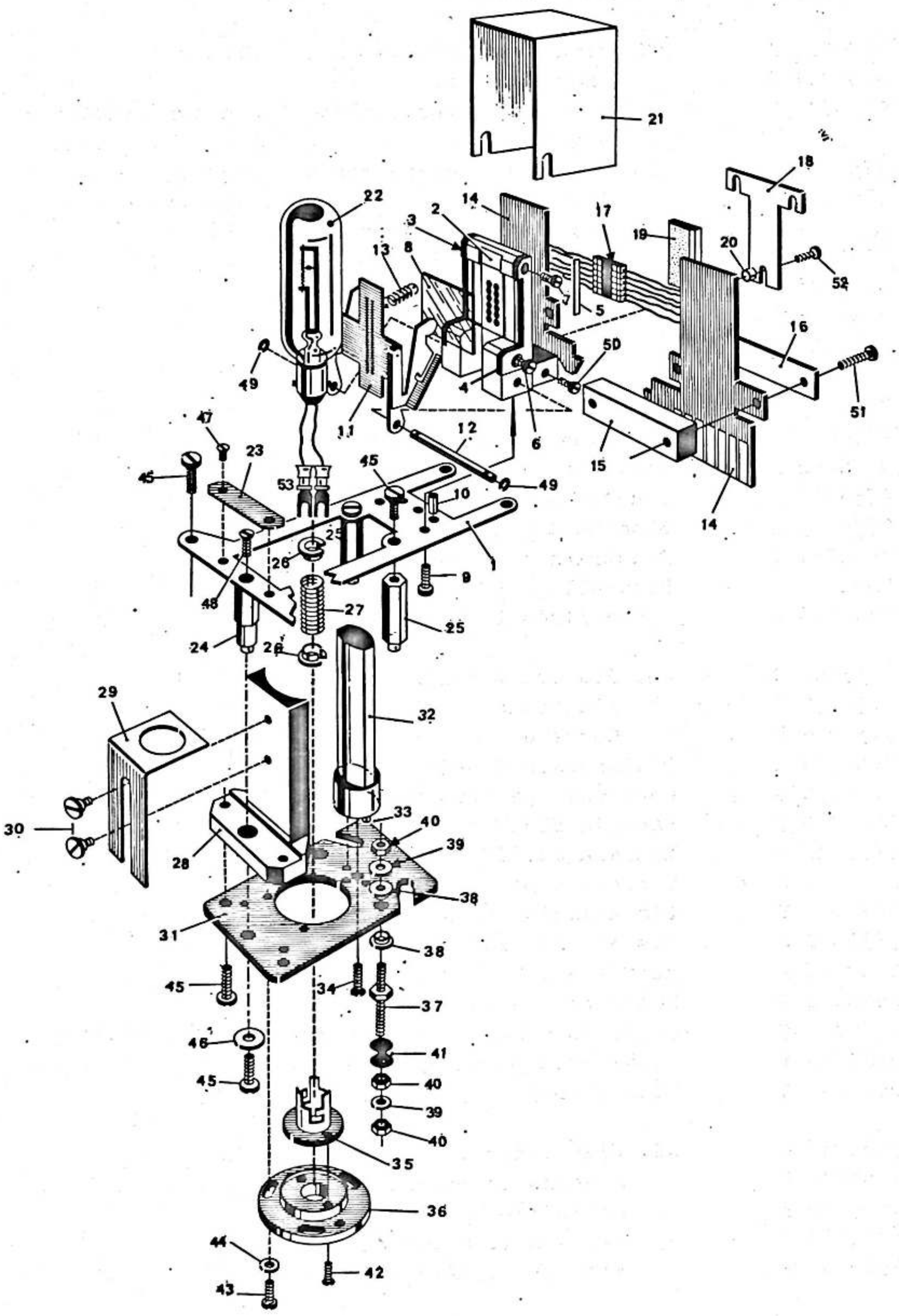
GENERAL ELECTRIC *Servizio Tecnico*	TESTINA 6 FORI QUADRI	FL 400/50C P. 3 Catalogo PR.

-	9756063 P		Testina completa
	9756044 A		AG. Fianchetto superiore con blocchetto
1	9756041 D		Fianchetto superiore
2	9756043 M		Blocchetto porta fotocellule con piastrine e viti
3	9756064 G		Piastrina destra per blocchetto
4	9756065 G		Piastrina sinistra per blocchetto
5	0660715 W		Distanziale fotocellule TF-B11
6	9925336 L		Vite TC 3MAx5,5
7	9925341 G		Vite TC 3MAx3,5
8	0660723 E		Vetrino TF-B17
9	9920307 X		Vite TC 3MAx9
10	6341109 V		Spina cilindrica ø 3x10
11	9756050 D		Premizona completo
12	9756051 E		Alberino per premizona
13	9756062 K		Molla premizona
14	9756061 F		Piastrina circuito stampato
15	9756053 N		Blocchetto distanziale piastrina
16	0660741 Y		Piastrina isolante TF-B33
17	5854215 G		Fotocellule BPY10 - 40÷80 µA
	5854216 L		Fotocellule BPY10 - 80÷140 µA
	9756057 D		AG. Piastrina con gommino
18	9756055 F		Piastrina
19	9756056 K		Gommino
20	0660742 C		Distanziale TF-B34
21	9756058 C		Coperchio per fotocellule
22	0660750 Y		Lampada SIPLE senza capicorda TF-B42
	0660743 G		Lampada PHILIPS con capicorda TF-B36
23	0660751 Z	*	Targhetta matricola TF-B43
24	0660720 V		Distanziale superiore TF-B115
25	9756052 J		Distanziale inferiore
26	0660716 A		Rondella per lampada TF-B12
27	0660714 S		Molla per lampada TF-B10
28	0660708 E		Supporto squadretta fissaggio lampada TF-B105
29	0660735 Y		Squadretta porta lampada TF-B28
30	0660736 C		Stud TF-B29
	9756046 J		AG. Fianchetto inferiore completo
31	9756045 E		Fianchetto inferiore
32	0660709 A		Lente TF-B6
33	6341109 V		Spina cilindrica ø 3x10
34	9920353 P		Vite TC 3,5MAx7

TESTINA 6 FORI QUADRI

FL 400/500 | P. 4
Catalogo PR.



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GENERAL ELECTRIC
Servizio Tecnico

TESTINA 6 FORI QUADRI

FL 400/500 P. 5
Catalogo PR.

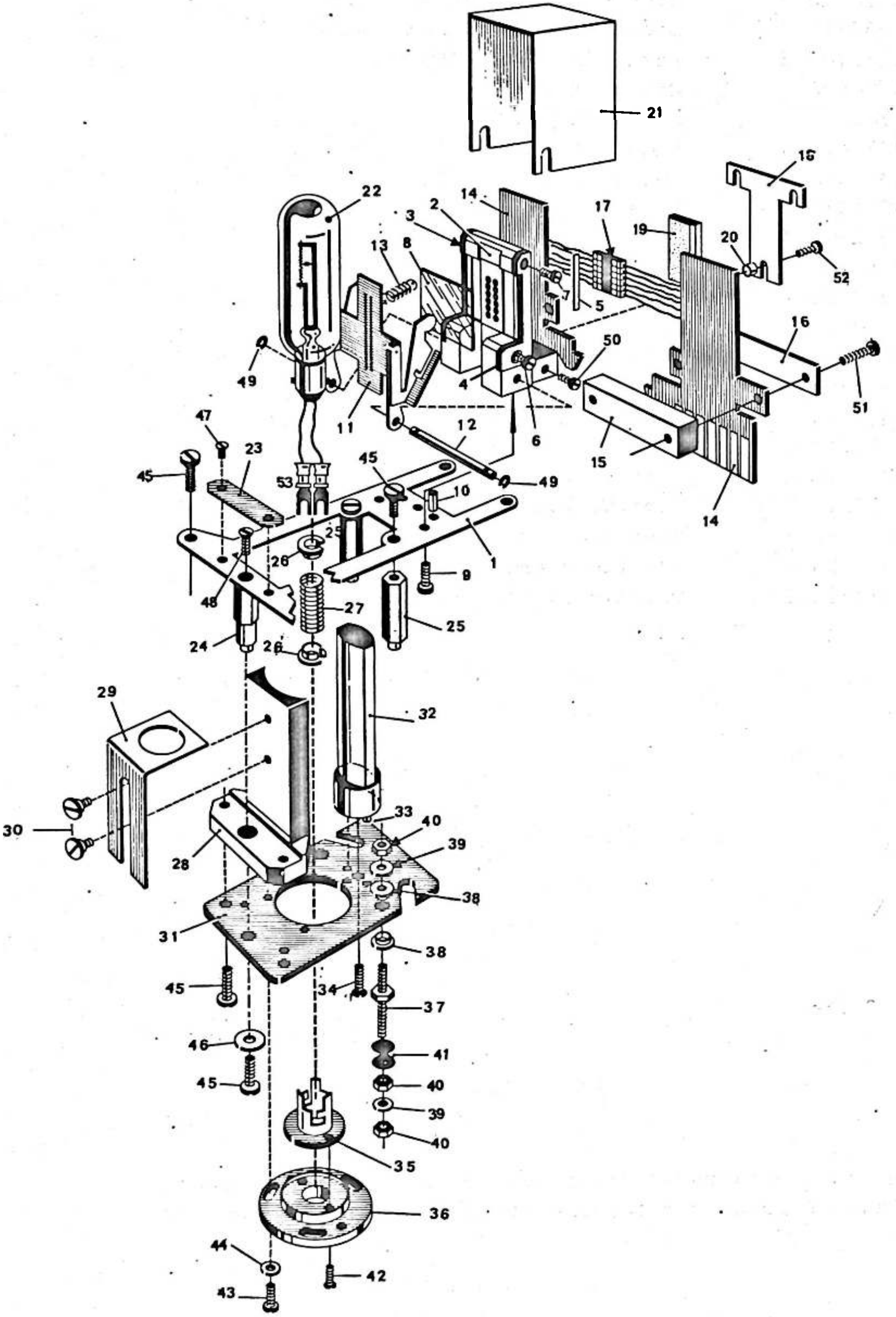
35	0660712 H	Gruppo portalampada TF-GB8
36	0660711 V	Boccola per portalampada TF-B7
37	0660705 H	Perno filettato TF-B3
38	0660622 G	Rondella isolante
39	9940427 Z	Rondella ∅ 4,2
40	9938405 Z	Dado 4MA
41	6351202 A	Rondella a tazza
42	9921212 N	Vite TP 2,6MAx6,5
43	9920305 P	Vite TC 3MAx7
44	9940326 K	Rondella ∅ 3,2
45	9920404 V	Vite TC 4MAx10
46	9940441 J	Rondella ∅ 4,3
47	9921911 H	Vite TP 2,6MAx5
48	9921351 G	Vite TP 3,5MAx7
49	6337105 C	Staffa elastica
50	9920211 H	Vite TC 2,6MAx5
51	9920215 A	Vite TC 2,6MAx20,5
52	9920216 N	Vite TC 2,6MAx7,5
53	5613526 H	Capocorda
-	5621203 P	Tubetto sterling nero ∅ 0,5
-	5621204 S	Tubetto sterling rosso ∅ 0,5

* - La targhetta è nera per testina con fotocellule 40÷80 /uA.
La targhetta è rossa per testina con fotocellule 80÷140 /uA.

GENERAL ELECTRIC
Servizio Tecnico

TESTINA 5+1 FORI TONDI

FL 400/500 P. 6
Catalogo PR.



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Mod. 0100 A

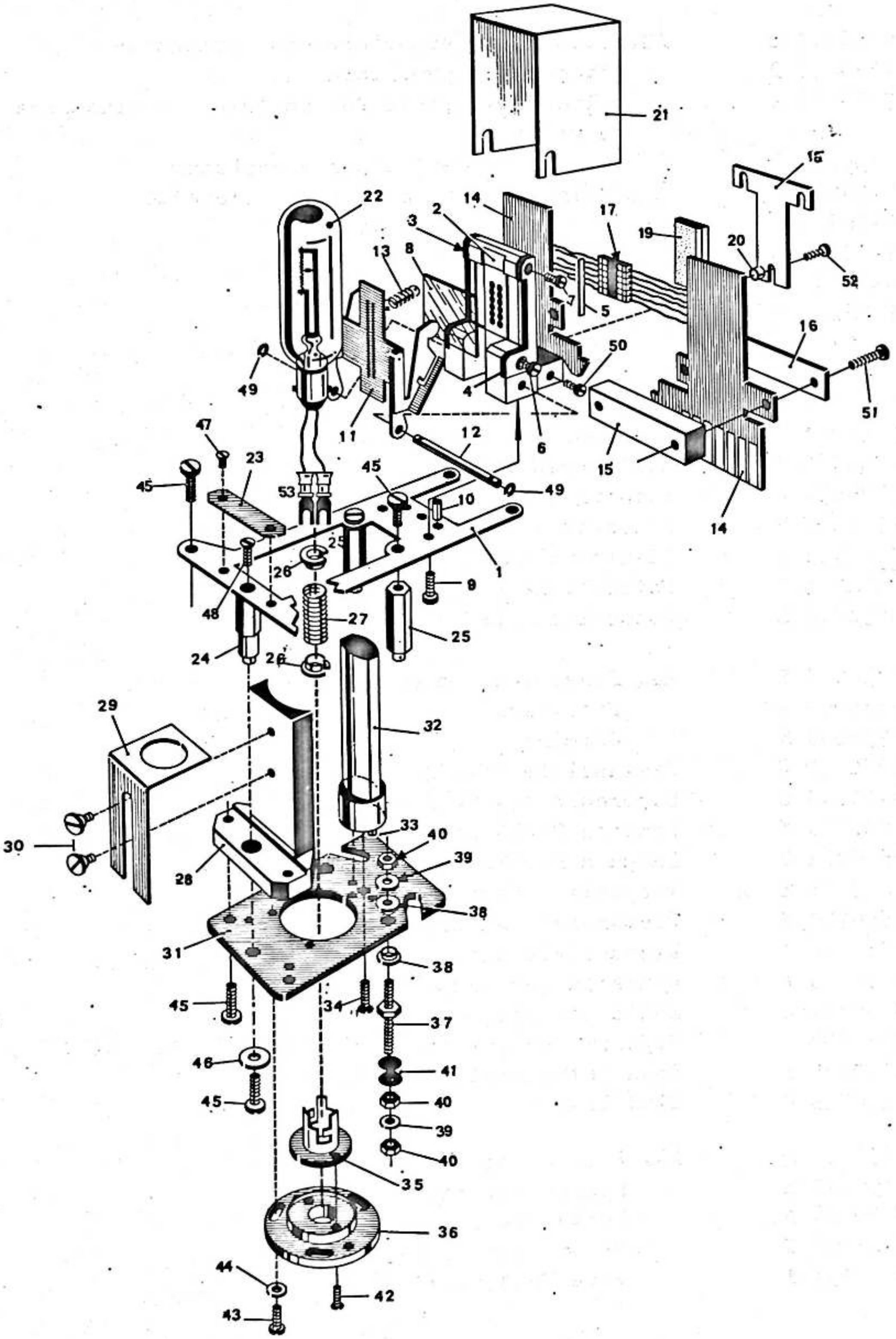
TESTINA 5+1 FORI TONDI

-	9756231 X	Testina completa
	9756223 E	AG. Fianchetto superiore con blocchetto
1	9756041 D	Fianchetto superiore
2	9756222 A	Blocchetto porta fotocellule con piastrine e viti
3	9756232 F	Piastrina destra per blocchetto
4	9756233 G	Piastrina sinistra per blocchetto
5	9756225 G	Distanziale fotocellule
6	9925336 L	Vite TC 3MAx5,5
7	9925341 G	Vite TC 3MAx3,5
8	9756224 T	Vetrino
9	9920307 X	Vite TC 3MAx9
10	6341109 V	Spina cilindrica ∅ 3x10
11	9756230 W	Premizona completo
12	9756051 E	Alberino per premizona
13	9756062 K	Molla premizona
14	9756061 F	Piastrina circuito stampato
15	9756053 N	Blocchetto distanziale piastrina
16	0660741 Y	Piastrina isolante TF-B33
17	5854215 G	Fotocellula BPY 10 - 40÷80 µA
	5854216 L	Fotocellula BPY 10 - 80÷140 µA
	9756057 P	AG. Piastrina con gommino
18	9756055 F	Piastrina
19	9756056 K	Gommino
20	0660742 C	Distanziale TF-B34
21	9756058 C	Coperchio per fotocellule
22	0660750 Y	Lampada SIPLE senza capicorda TF-B42
	0660743 G	Lampada PHILIPS con capicorda TF-B36
23	0660751 Z *	Targhetta matricola TF-B43
24	0660720 V	Distanziale superiore TF-B115
25	9756052 J	Distanziale inferiore
26	0660716 A	Rondella per lampada TF-B12
27	0660714 S	Molla per lampada TF-B10
28	0660708 E	Supporto squadretta fissaggio lampada TF-B105
29	0660735 Y	Squadretta porta lampada TF-B28
30	0660736 C	Stud TF-B29
	9756046 J	AG. Fianchetto inferiore completo
31	9756045 E	Fianchetto inferiore
32	0660709 A	Lente TF-B6
33	6341109 V	Spina cilindrica ∅ 3x10
34	9920353 P	Vite TP 3,5MAx7

GENERAL ELECTRIC
Servizio Tecnico

TESTINA 5+1 FORI TONDI.

Catalogo PR.

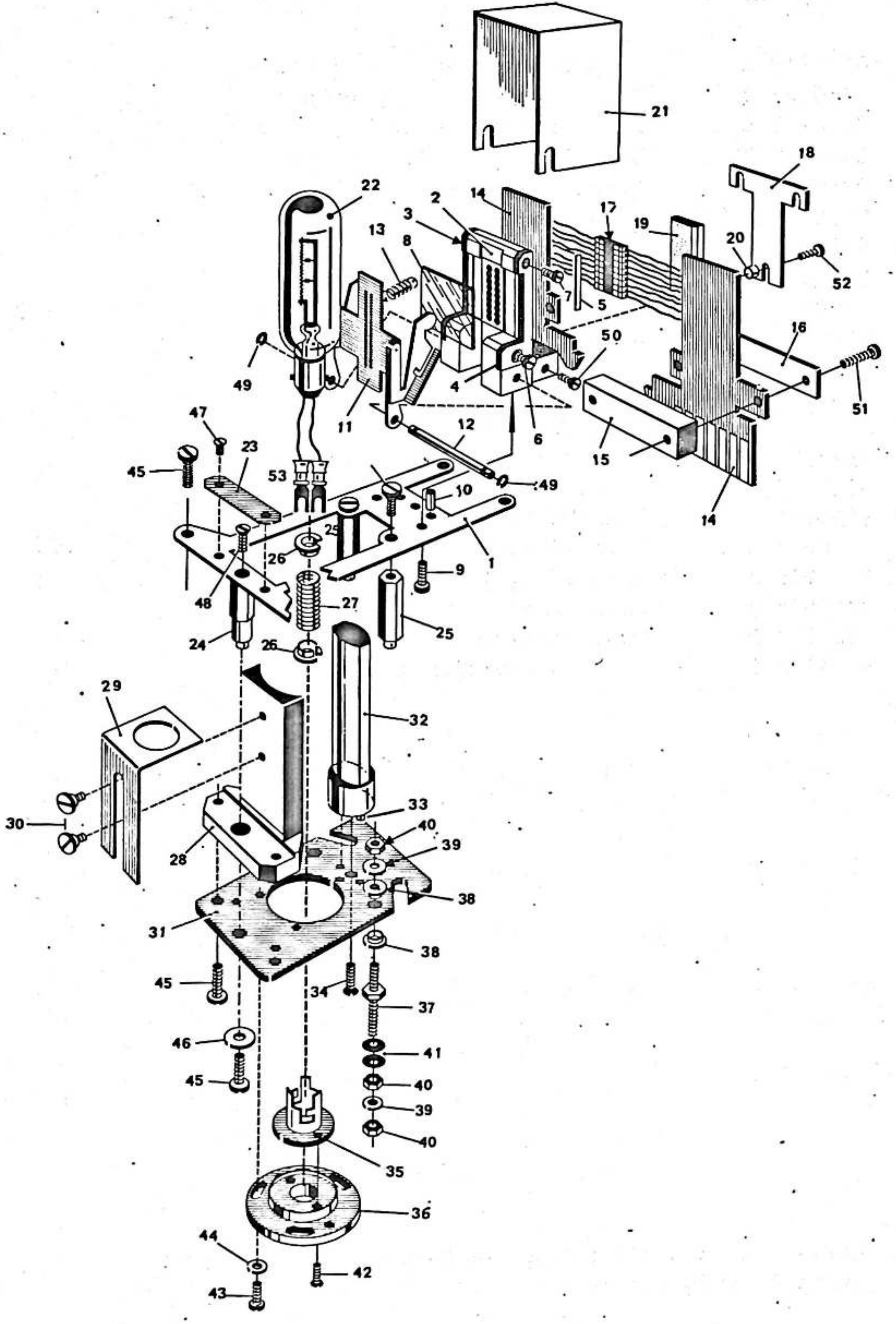


TESTINA 5+1 FORI TONDI

35	0660712 H	Gruppo portalampada TF-GB8
36	9756226 B	Boccola per portalampada
37	0660705 H	Perno filettato TF-B3
38	0660622 G	Rondella isolante
39	9940427 Z	Rondella Ø 4,2
40	9938405 Z	Dado 4MA
41	6351202 A	Rondella a tazza
42	9921212 N	Vite TP 2,6MAx6,5
43	9920305 P	Vite TC 3MAx7
44	9940326 K	Rondella Ø 3,2
45	9920404 V	Vite TC 4MAx10
46	9940441 J	Rondella Ø 4,3
47	9921211 H	Vite TP 2,6MAx5
48	9921351 G	Vite TP 3,5MAx7
49	6337105 C	Staffa elastica
50	9920211 H	Vite TC 2,6MAx5
51	9920215 A	Vite TC 2,6MAx20,5
52	9920216 N	Vite TC 2,6MAx7,5
53	5113526 H	Capocorda
-	5621203 P	Tubetto sterling nero Ø 0,5
-	5621204 S	Tubetto sterling rosso Ø 0,5

* – La targhetta è nera per testina con fotocellule 40÷80 µA
La targhetta è rossa per testina con fotocellule 80÷140 µA

GENERAL ELECTRIC *Servizio Tecnico*	TESTINA 8+1 FORI TONDI	FL 400/500	P. 10
		Catalogo PR.	



TESTINA 8+1 FORI TONDI

-	9756249 S		Testina completa
	9756243 G		AG. Fianchetto superiore con blocchetto
1	9756041 D		Fianchetto superiore
2	9756242 C		Blocchetto porta fotocellule con piastrine e viti
3	9756250 Y		Piastrina destra per blocchetto
4	9756251 Z		Piastrina sinistra per blocchetto
5	9756245 H		Distanziale fotocellula
6	9925336 L		Vite TC 3MAx5,5
7	9925341 G		Vite TC 3MAx3,5
8	9756244 V		Vetrino
9	9920307 X		Vite TC 3MAx9
10	6431109 V		Spina cilindrica ∅ 3x10
11	9756230 W		Premizona completo
12	9756051 E		Alberino per premizona
13	9756062 K		Molla premizona
14	9756247 H		Piastrina circuito stampato
15	9756053 N		Blocchetto distanziale piastrina
16	0660741 Y		Piastrina isolante TF-B33
17	5854215 G		Fotocellula BPY10 - 40÷80 /uA
	5854216 L		Fotocellula BPY10 - 80÷140 /uA
	9756057 P		AG. Piastrina con gommino
18	9756055 F		Piastrina
19	9756056 K		Gommino
20	0660742 C		Distanziale TF-B34
21	9756058 C		Coperchio per fotocellule
22	9756246 M		Lampada
23	0660751 Z	*	Targhetta matricola TF-B43
24	0660720 V		Distanziale superiore TF-B115
25	9756052 J		Distanziale inferiore
26	0660716 A		Rondella per lampada TF-B12
27	0660714 S		Molla per lampada TF-B10
28	0660708 E		Supporto squadretta fissaggio lampada TF-B105
29	0660735 Y		Squadretta porta lampada TF-B28
30	0660736 C		Stud TF-B29
	9756046 J		AG. Fianchetto inferiore completo
31	9756045 E		Fianchetto inferiore
32	0660709 A		Lente TF-B6
33	6341109 V		Spina cilindrica ∅ 3x10
34	9920353 P		Vite TP 3,5MAx7

GENERAL ELECTRIC
Servizio Tecnico

TESTINA 8+1 FORI TONDI

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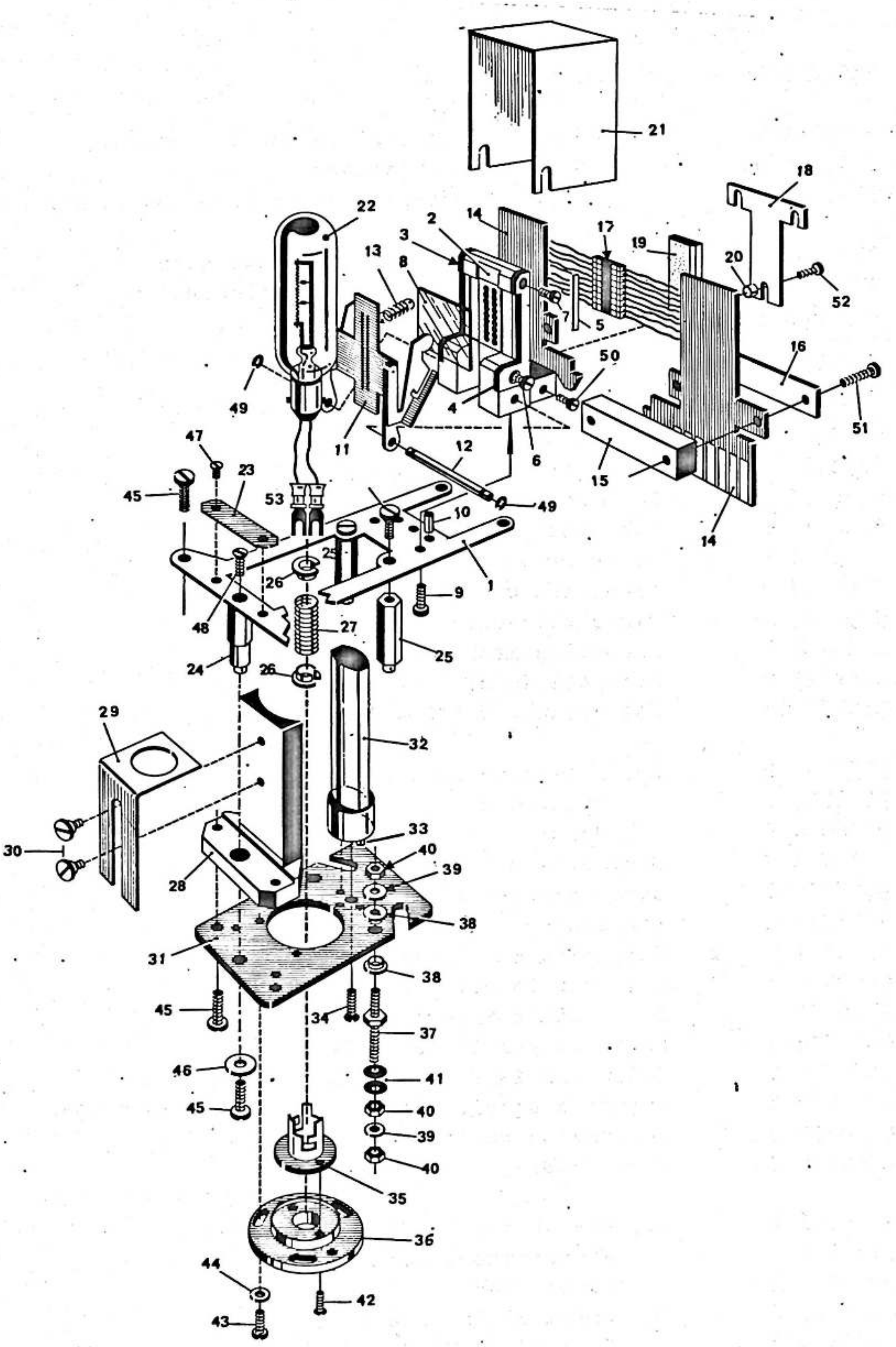
Catalogo PR.



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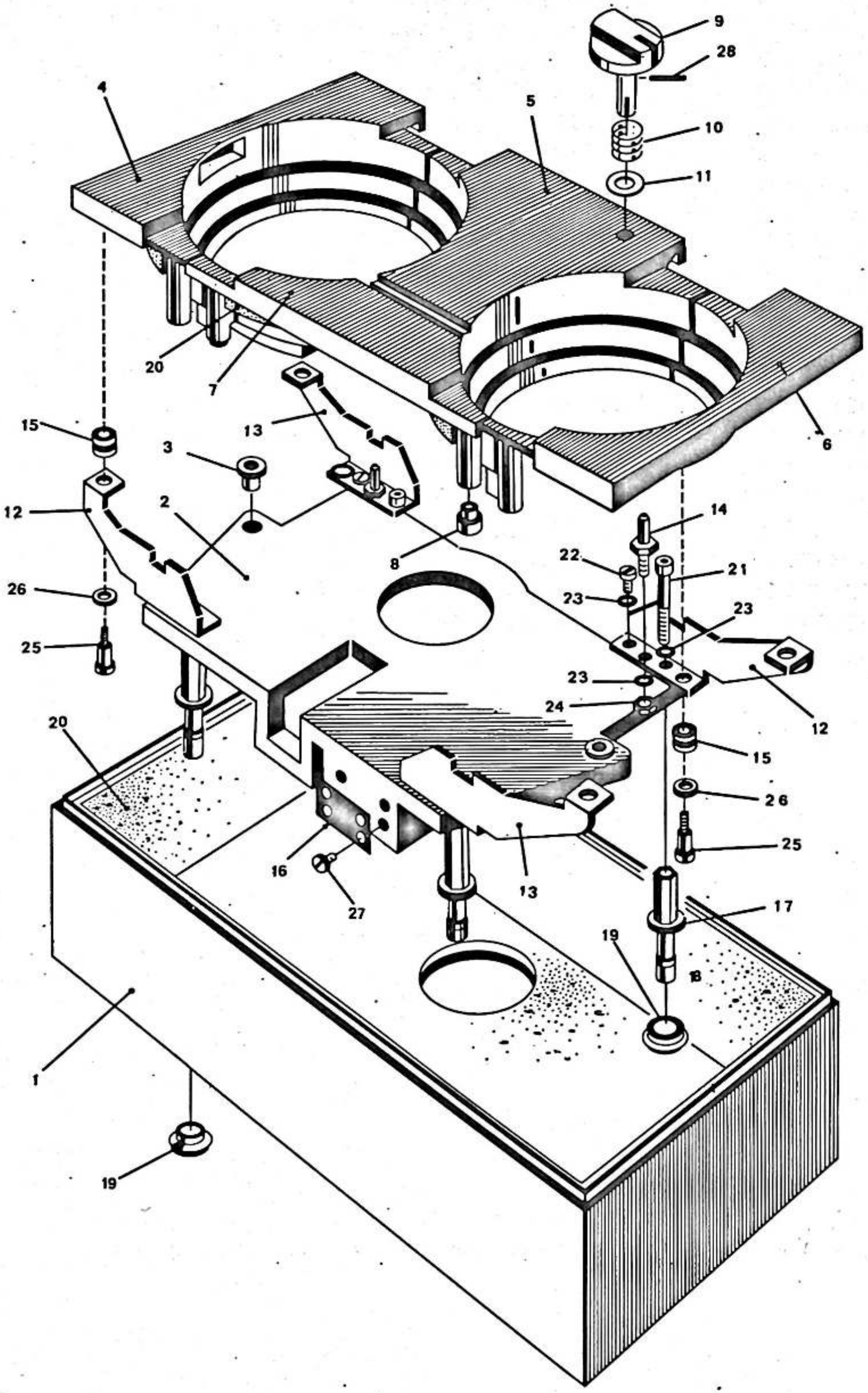
Mod. 0100 A

TESTINA 8+1 FORI TONDI

35	0660712	H	Gruppo portalampada TF-GB8
36	0660711	V	Boccola per portalampada TF--B7
37	0660705	H	Perno filettato TF-B3
38	0660622	G	Rondella isolante
39	9940427	Z	Rondella Ø 4,2
40	9938405	Z	Dado 4MA
41	6351202	A	Rondella a tazza
42	9921212	N	Vite TP 2,6MAx6,5
43	9920305	P	Vite TC 3MAx7
44	9940326	K	Rondella Ø 3,2
45	9920404	V	Vite TC 4MAx10
46	9940441	J	Rondella Ø 4,3
47	9921911	H	Vite TP 2,6MAx5
48	9921351	G	Vite TP 3,5MAx7
49	6337105	C	Staffa elastica
50	9920211	H	Vite TC 2,6MAx5
51	9920215	A	Vite TC 2,6MAx20,5
52	9920216	N	Vite TC 2,6MAx7,5
53	5613526	H	Capocorda
-	5621203	P	Tubetto sterling nero Ø 0,5
-	5621204	S	Tubetto sterling rosso Ø 0,5

* – La targhetta è nera per testina con fotocellule 40÷80 μA
La targhetta è rossa per testina con fotocellule 80÷140 μA

MOBILE ELEMENTARE



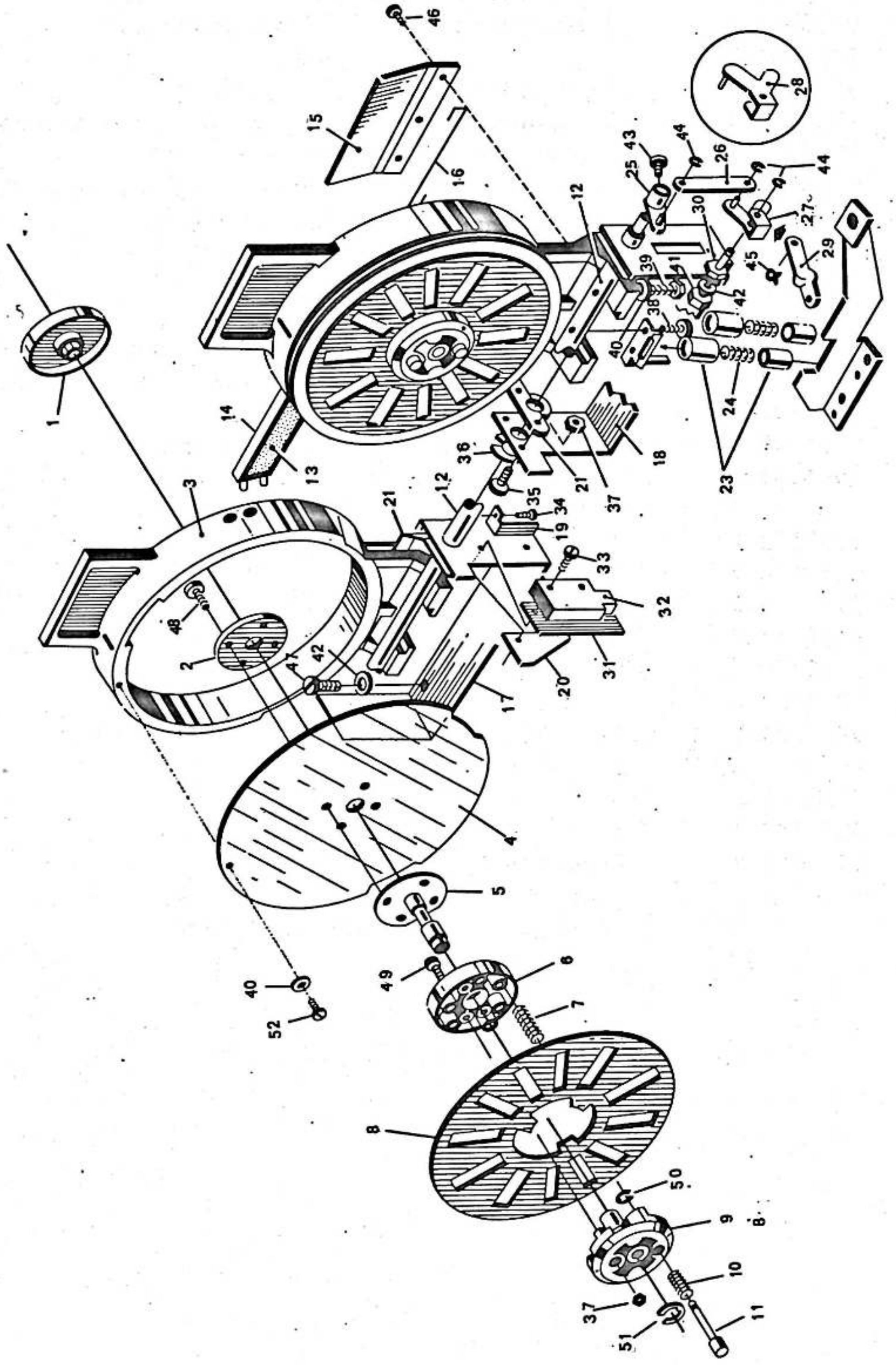
MOBILE ELEMENTARE

1	9755421 W	Carrozzeria completa
2	9756001 M	Supporto principale (con boccole)
3	9755004 E	Boccola
4	9756188 X	Coperchio sinistro
5	9756185 J	Coperchio centrale posteriore (con ammortizzatori)
6	9756187 S	Coperchio destro
7	9756186 W	Coperchio centrale anteriore (con ammortizzatori)
8	9755291 X	Ammortizzatore coperchi centrali
9	9756107 P	Manopola di comando
10	9756124 Z	Molla
11		Rondella isolante T2-P247
12	9755288 W	Supporto inferiore sinistro e superiore destro
13	9755289 Q	Supporto inferiore destro e superiore sinistro
14	9755293 H	Colonnina di ancoraggio
15	9755290 G	Ammortizzatore coperchi laterali
16	0661008 A	Targhetta matricola
	9755513 F	AG. Perno fissaggio con gomma
17	9755512 B	Perno fissaggio
18	9755016 B	Gommino
19	9471033 B	Antivibrante
20	3432720 L	Gommapiuma S=10
21	6313123 E	Vite TCE 4MAx40
22	9920404 V	Vite TC 4MAx10
23	9940427 Z	Rondella ∅ 4,2
24	9938407 H	Dado 4MA
25	9926397 A	Stud
26	9940618 R	Rondella ∅ 6,1
27	9920304 K	Vite TC 3MAx5
28		Spina elastica Tessal ∅ 2,5x18

COPERCHI PREMIBANDA

FL 400/500

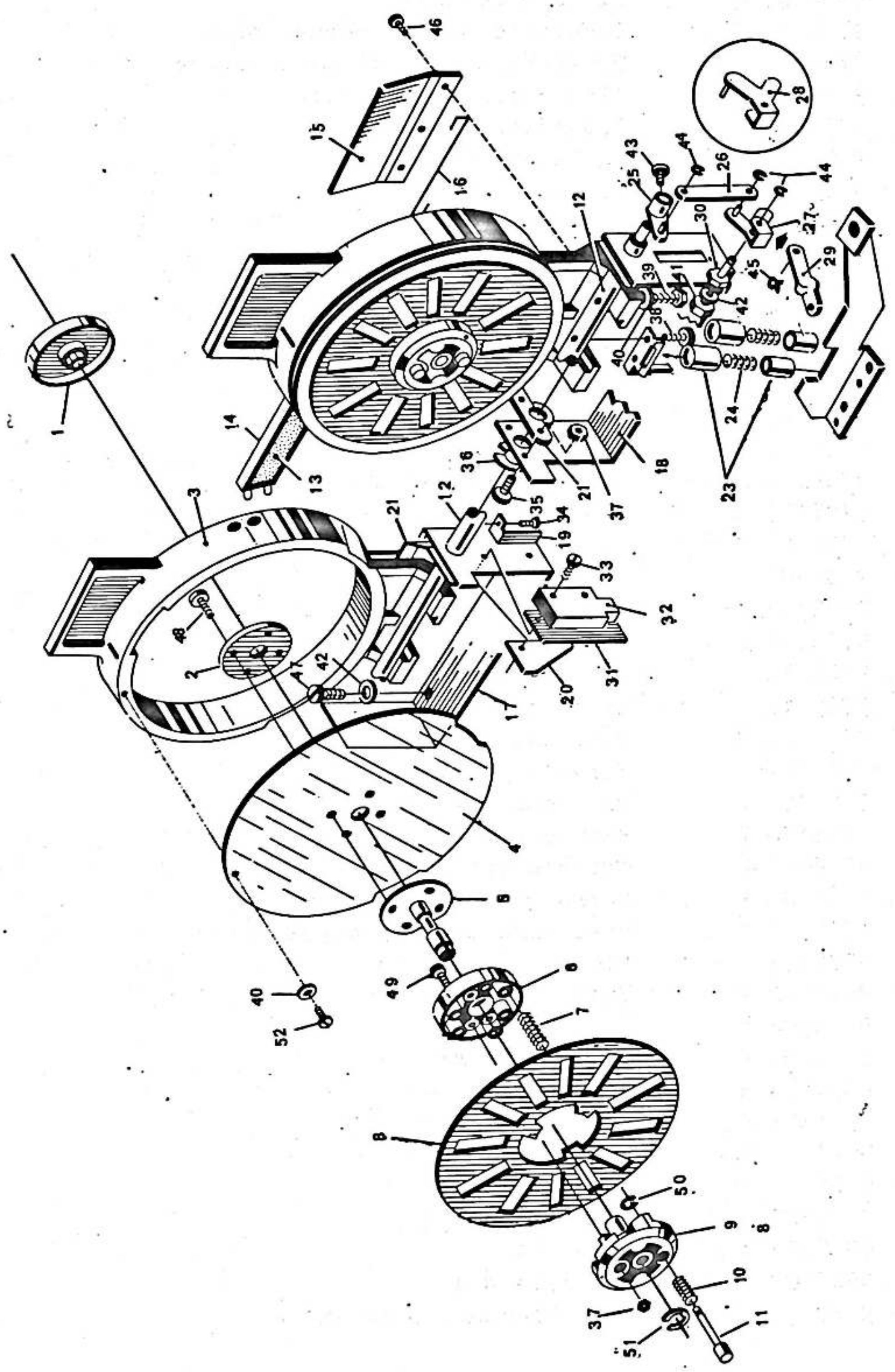
Catalogo PR.



COPERCHI PREMIBANDA

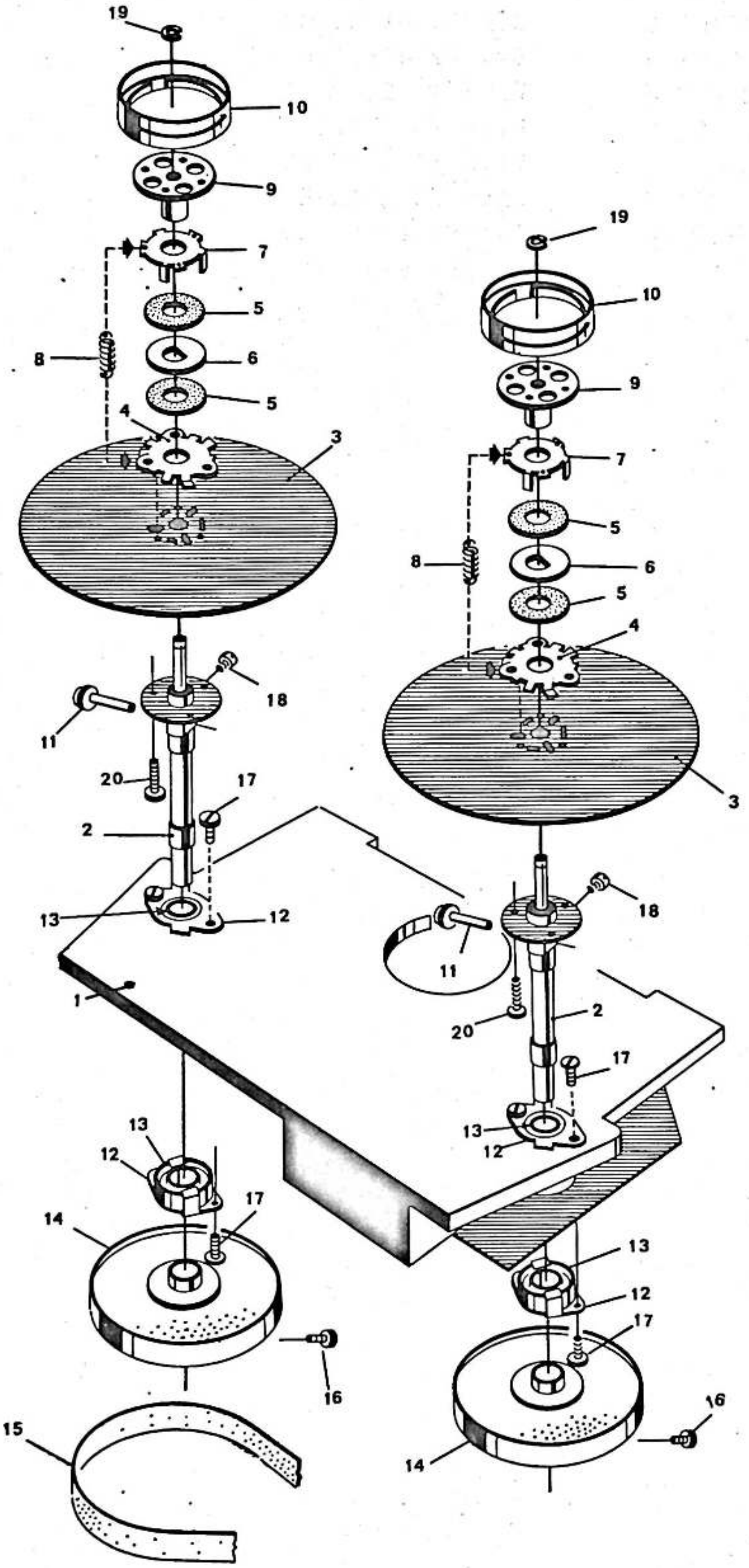
1	9755276 U	Copridisco piatti superiori
2	9755265 K	Disco bloccaggio
3	9755433 F	Coperchio piatti portabobine
4	9755266 T	Trasparente piatti portabobine
5	9755263 U	Albero piatto superiore
6	9755259 P	Coperchio innesto
7	9756131 V	Molla premipiatto
8	9755258 K	Piatto superiore
9	9755254 J	Anello innesto riavvolgimento
10	9755257 W	Molla innesto
11	9755256 S	Innesto per portabobine
12	9756161 Y	Albero per coperchio piatti
13	3433580 S	Gommapiuma S=6
14	9756165 Z	Coperchio fessura
15	9755423 C	Coperchietto posteriore
16	9755296 E	Molla a torsione
17	9756178 X	Supporto sinistro albero
18	9756177 A	Supporto destro albero
19	9756162 C	Leva comando microinterruttore
20	9705304 A	Piastrina
21	9755422 A	Copertura posteriore fissa
22	9755314 Q	Piastrina per molle
23	9755272 T	Astuccio telescopico
24	9755315 L	Molla astuccio telescopico
25	9756168 W	Manovella comando
26	9756167 H	Tirante per rinvio
27	9756169 S	Rinvio destro comando camme
28	9756170 Y	Rinvio sinistro comando camme
29	9756171 Z	Tirante per camma
30	9756105 F	Perno galoppino cambio
31	9705303 N	Piastrina microinterruttore
32	9705333 C	Microinterruttore
33	9920202 Y	Vite TC 2,3MAx13,5
34	9920304 K	Vite TC 3MAx5
35	9920305 P	Vite TC 3MAx7
36	6337123 H	Staffa elastica
37	9938305 P	Dado 3MA
38	9920353 P	Vite TC 3,5MAx7
39	9925403 A	Vite TE 4MAx18
40	9940427 Z	Rondella ∅ 4,2
41	9938405 Z	Dado 4MA
42	9940402 E	Rondella ∅ 4
43	9920302 S	Vite bloccaggio TC 3MAx4

COPERCHI PREMIBANDA



44	6337107 L	Staffa elastica
45	9945161 G	Staffa elastica
46	9920217 J	Vite TC 2,6MAx3
47	9920404 V	Vite TC 4MAx10
48	9920354 C	Vite TC 3,5MAx9
49	9920301 N	Vite TC 3MAx10,8
50	6337105 C	Staffa elastica
51	6337109 D	Staffa elastica
52	9920405 Z	Vite TC 4MAx15

GENERAL ELECTRIC *Servizio Tecnico*	BANCALE E PIATTI PORTABANDA	FL 400/500	P. 20
		Catalogo PR.	



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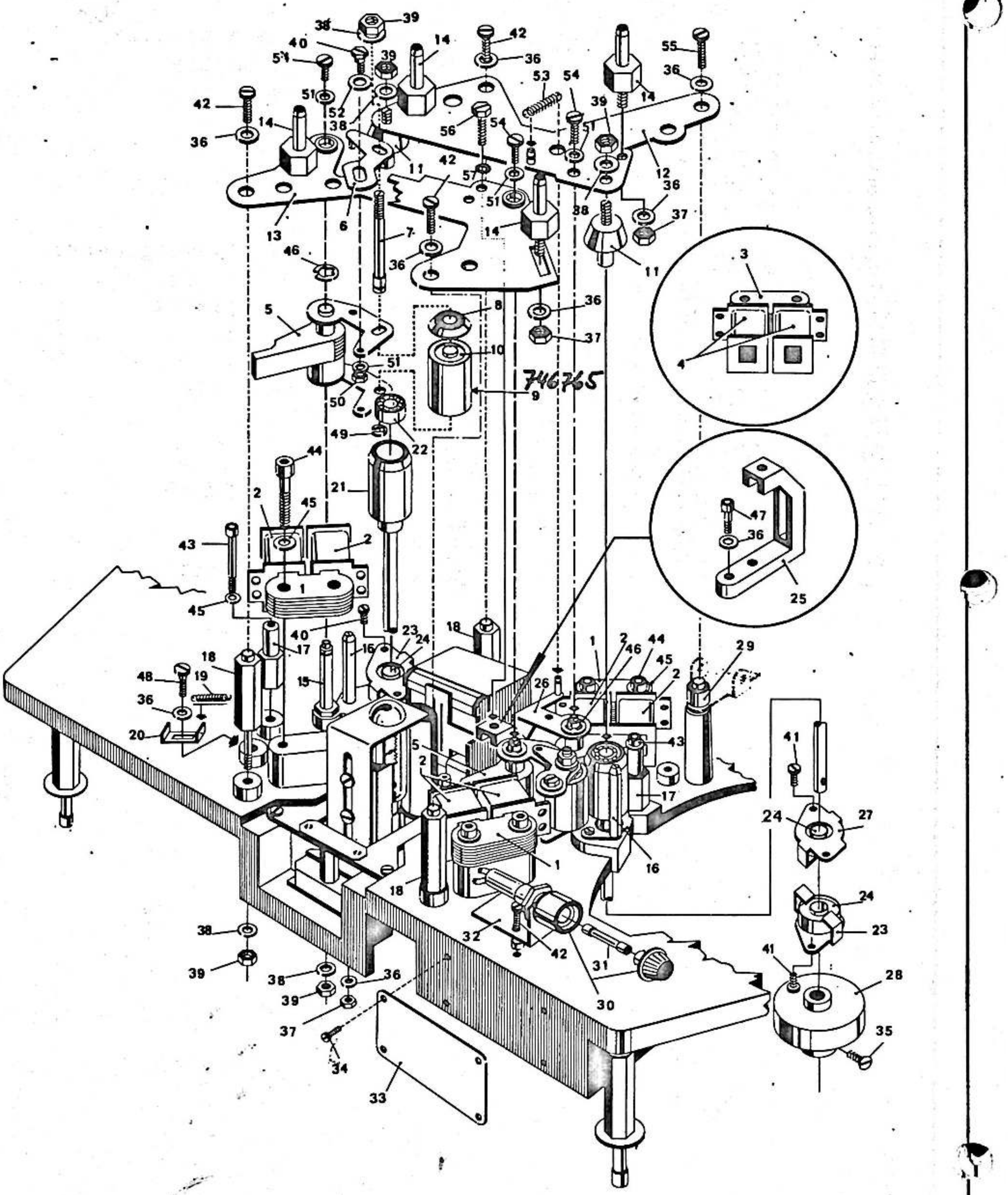
BANCALE E PIATTI PORTABANDA

I	975600I	M	Supporto principale (con boccole)
2	975603I	C	Alberino piatti porta bobine
3	9756036	R	Piatto inferiore porta bobine
4	975532I	Q	Flangia frizione
5	9755324	R	Suberit frizione piatto
6	9755323	U	Disco trascinato frizione
7	9755322	Y	Flangia della frizione
8	9755325	M	Molla frizione piatto
9	9755278	M	Gruppo flangia bobina riavvolgimento
IO	9755253	V	Anello portabobine
II	9756I38	T	Eccentrico regolazione piatti
I2	9703257	L	Portacuscinetto
I3	9726058	H	Cuscinetto RIV LJ8
I4	9756I46	B	Puleggia albero portabobine
I5	9756I49	Y	Cinghia
I6	9920352	K	Vite TC 3,5MAx6
I7	9920303	W	Vite TC 3MAx6
I8	992235I	L	Vite di pressione TC 3,5MAx5
I9	6337I09	D	Staffa elastica
20	9920357	Q	Vite TC 3,5MAxI2
–	9756037	M	Nucleo portabobine ausiliarie

TRASCINAMENTO BANDA



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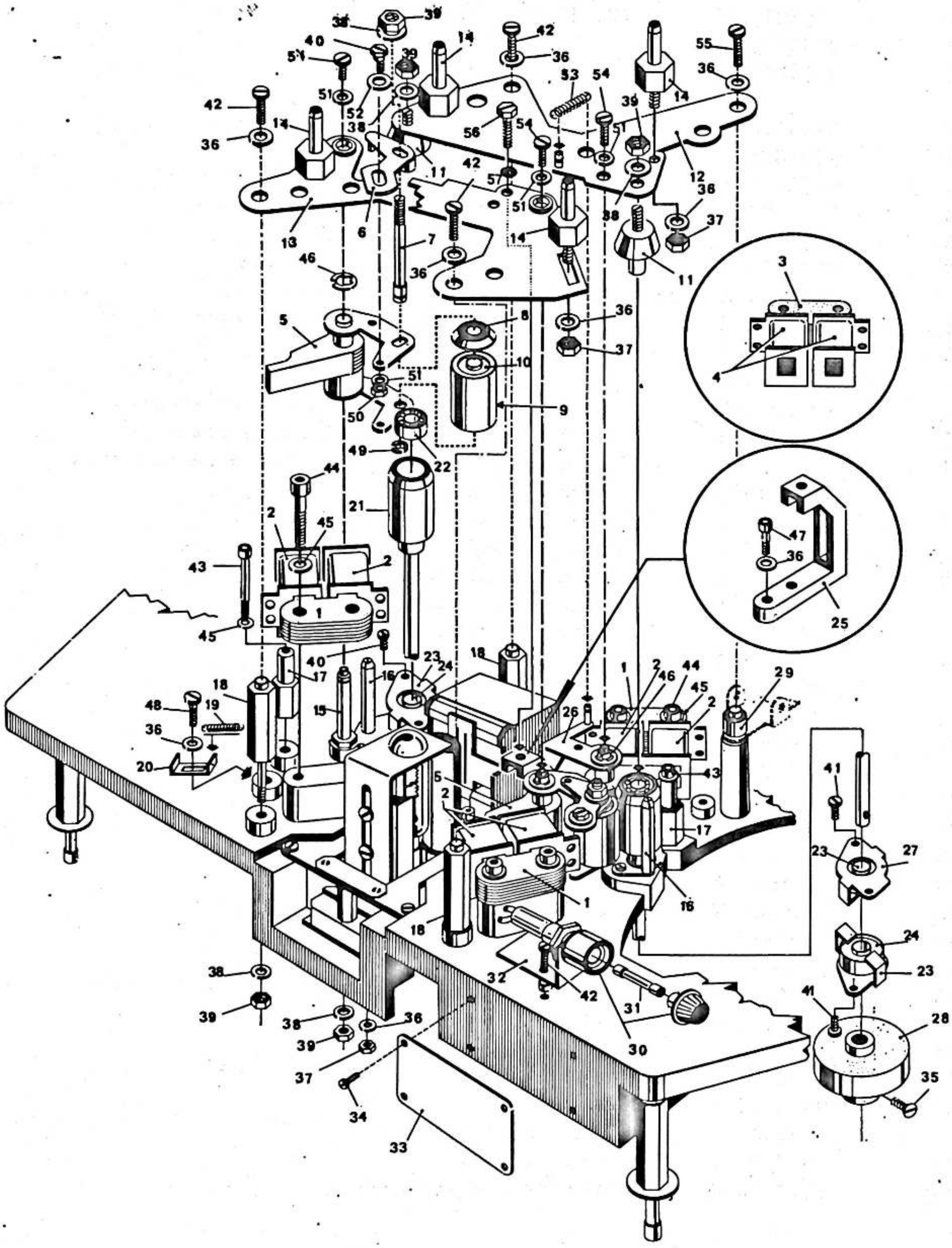
TRASCINAMENTO BANDA

-	9756073 R		AG. Elettromagnete
1	9756005 N		Nucleo elettromagnete
2	9756007 X		Bobina elettromagnete
-	9756072 M	*	AG. Elettromagnete completo stop
3	9756005 P		Nucleo elettromagnete
4	9756071 H		Bobina elettromagnete
5	9756013 K		Bilanciere rullini
6	9756133 D		Piastrina bilanciere rullino
7	9756136 A		Alberino del rullino inferiore
8	9756139 X	**	Rondella battuta per cuscinetto
9	9756074 E		Gruppo rullino trascinamento zona 746765
10	9755450 Y		Cuscinetto RIV 10655a/022
11	9756127 D		Perno cuscinetto superiore
12	9756025 D		Piastra supporto superiore carrozzeria
13	9756026 R		Piastra supporto inferiore carrozzeria
14	9756029 E		Perno fissaggio parte centrale carrozzeria
15	9756018 H		Perno del bilanciere
16	9756023 L		Perno guidacarta fisso
17	9756017 L		Eccentrico di regolazione ancorina
18	9756027 M		Colonnina piastra supporto
19	9756034 A		Molla ancorina
20	9756032 R		Piastrina bilancieri
21	9756021 C		Albero rullino avanzamento
22	9756128 S		Cuscinetto albero rullini ADR V6
23	9703257 L		Portacuscinetto
24	9726058 D		Cuscinetto RIV LJ8
25	9756024 H		Arresto fisso dello stop
26	9756016 Q		Bilanciere dello stop
27	9756022 Q		Flangia cuscinetto superiore albero rullino
28	9756143 E		Puleggia albero avanzamento banda
29	9756028 A		Distanziale piastra
30	9709341 W		Portafusibile
31	9709342 A		Fusibile 1A
32	9748031 U		Squadretta
33	0661008 A		Targhetta matricola
34	9920304 K		Vite TC 3MAx5
35	9921352 L		Vite TP 3,5MAx11
36	9940427 Z		Rondella ø 4
37	9938405 Z		Dado 4MA
38	9940544 R		Rondella ø 5,3
39	9938505 T		Dado 5MA
40	9724110 P		Vite TE 3MA eccentrica

GENERAL ELECTRIC
Servizio Tecnico

TRASCINAMENTO BANDA

Catalogo PR.

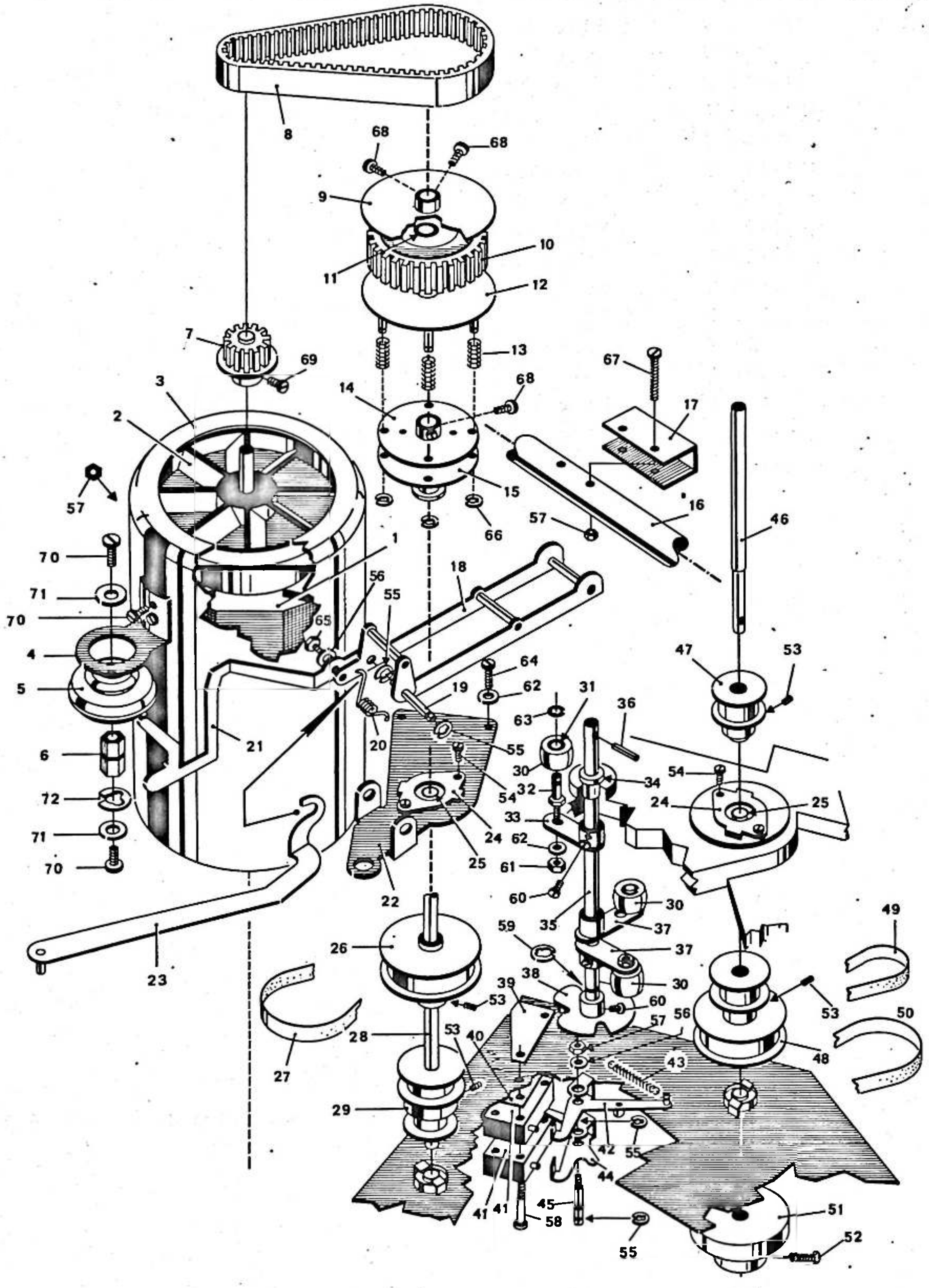


41	9920303 W	Vite TC 3MAx6
42	9920404 V	Vite TC 4MAx10
43	6313138 V	Vite TCE 5MAx40
44	6313134 U	Vite TCE 5MAx20
45	9940502 G	Rondella ∅ 5
46	6337111 Y	Staffa elastica
47	6313117 E	Vite TCE 4MAx15
48	9920402 C	Vite TC 4MAx7
49	6337109 D	Staffa elastica
50	9938305 P	Dado 3MA
51	9940302 U	Rondella ∅ 3
52	9940544 R	Rondella ∅ 5,3
53	9963123 V	Molla
54	9920307 X	Vite TC 3MAx9
55	6313120 V	Vite TC 4MAx25
56	9925502 G	Vite TE 5MAx10
57	9940520 R	Rondella ∅ 5,1

* - Per Fotolettore con testina a 5+1 ed a 8+1 fori tondi.

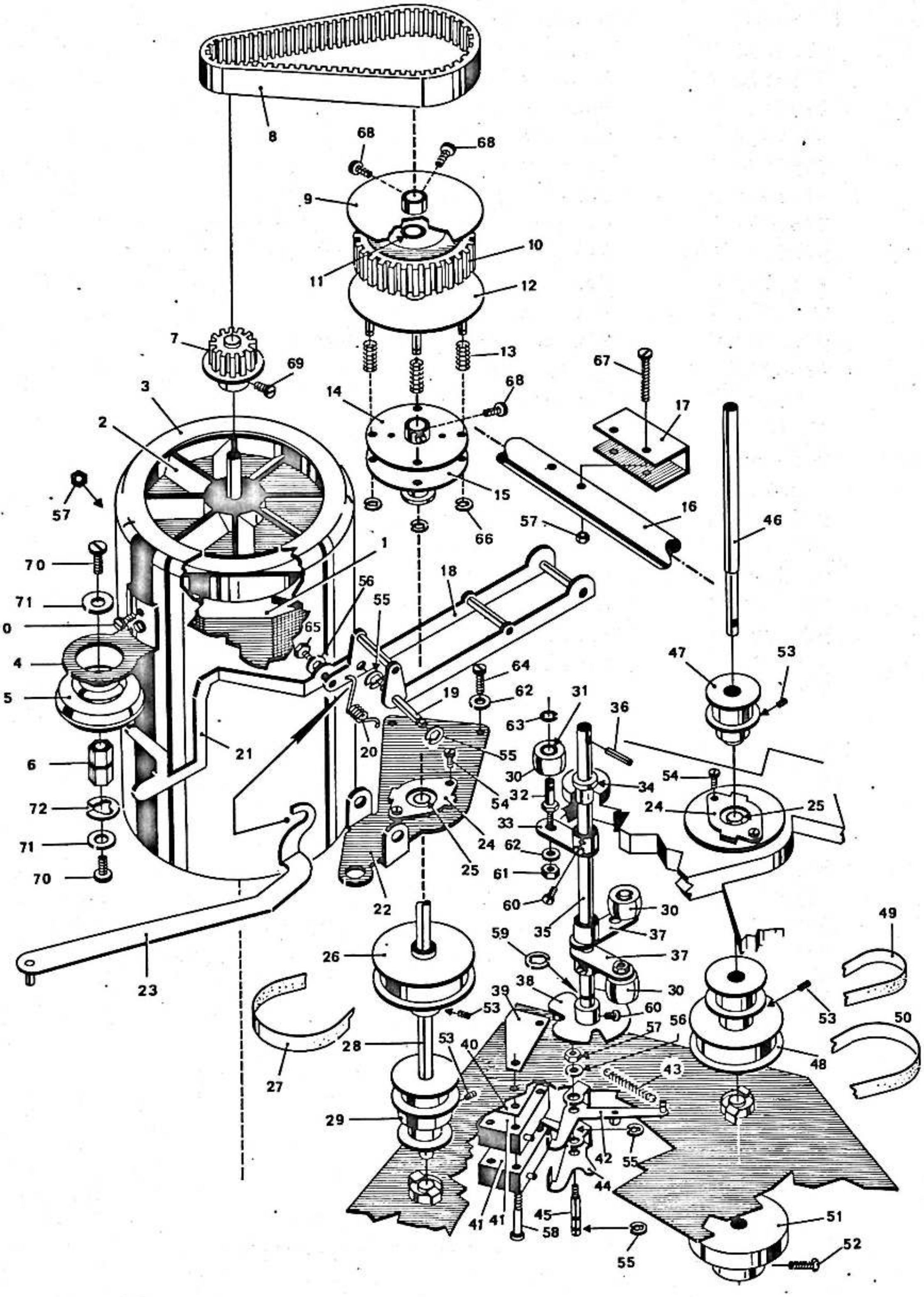
** - Sostituisce il distanziale 9940572 T, montato su alberino 9756136 A di vecchio tipo.

MOTORE - CAMBIO VELOCITA'



1	(9755197 G (9755203 C	Motore 220 V. - 50Hz Motore 115 V. - 60Hz
2	9703454 L	Ventola motore
3	9755172 Z	Tubo ventilazione motore
4	9756123 C	Squadretta fissaggio motore
5	9471033 Y	Antivibrante
6	9755174 J	Colonnina per antivibrante
7	9756081 R	Ruota dentata motrice
8	9756083 Z	Cinghia dentata albero motore
9	9756087 S	Piatto superiore frizione
10	9756084 N	Ruota dentata condotta
11	9756085 J	Boccola ruota dentata
12	9756089 K	Piatto inferiore frizione
13	9756093 S	Molla per frizione
14	9756090 R	Disco fisso frizione
15	9756091 J	Disco svincolo frizione
16	9756161 Y	Albero per piatti
17	9756122 G	Camma comando frizione
18	9756118 Z	Telaio comando frizione
19	9756119 V	Alberino per telaio comando
20	9756121 U	Molla oer telaio comando frizione
21	9756120 T	Leva comando apertura premizona
22	9756094 P	Piastra supporto cuscinetto
23	9756132 Z	Tirante comando pinza stop
24	9703257 T	Portacuscinetto
25	9726058 H	Cuscinetto RIV LJ8.
26	9756097 T	Puleggia conduttrice riavvolgimento
27	9756112 F	Cinghia riavvolgimento
28	9756095 K	Albero della frizione
29	9756096 X	Puleggia conduttrice del cambio
30	9756104 B	Galoppino del cambio (con boccola)
31	9755003 R	Boccola
32	9756105 F	Perno per galoppino del cambio
33	9756101 E	Leva per galoppino di riavvolgimento
34	9701385 H	Boccola T2-B834
35	9756106 K	Albero comando cambio
36		Spina elastica Tessal ∅ 2,5x12
37	9756103 N	Leva galoppino 1° e 2° velocità
38	9756109 G	Posizionatore del cambio
39	9705304 A	Piastrina microinterruttore
40	9705303 N	Piastrina isolante
41	9705333 C	Microinterruttore
42	9756110 S	Leva del posizionatore
43	9756126 H	Molla per leva posizionatore

GENERAL ELECTRIC *Servizio Tecnico*	MOTORE - CAMBIO VELOCITA'	FL 400/500	P. 28
		Catalogo PR.	



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Mod. 0100 A

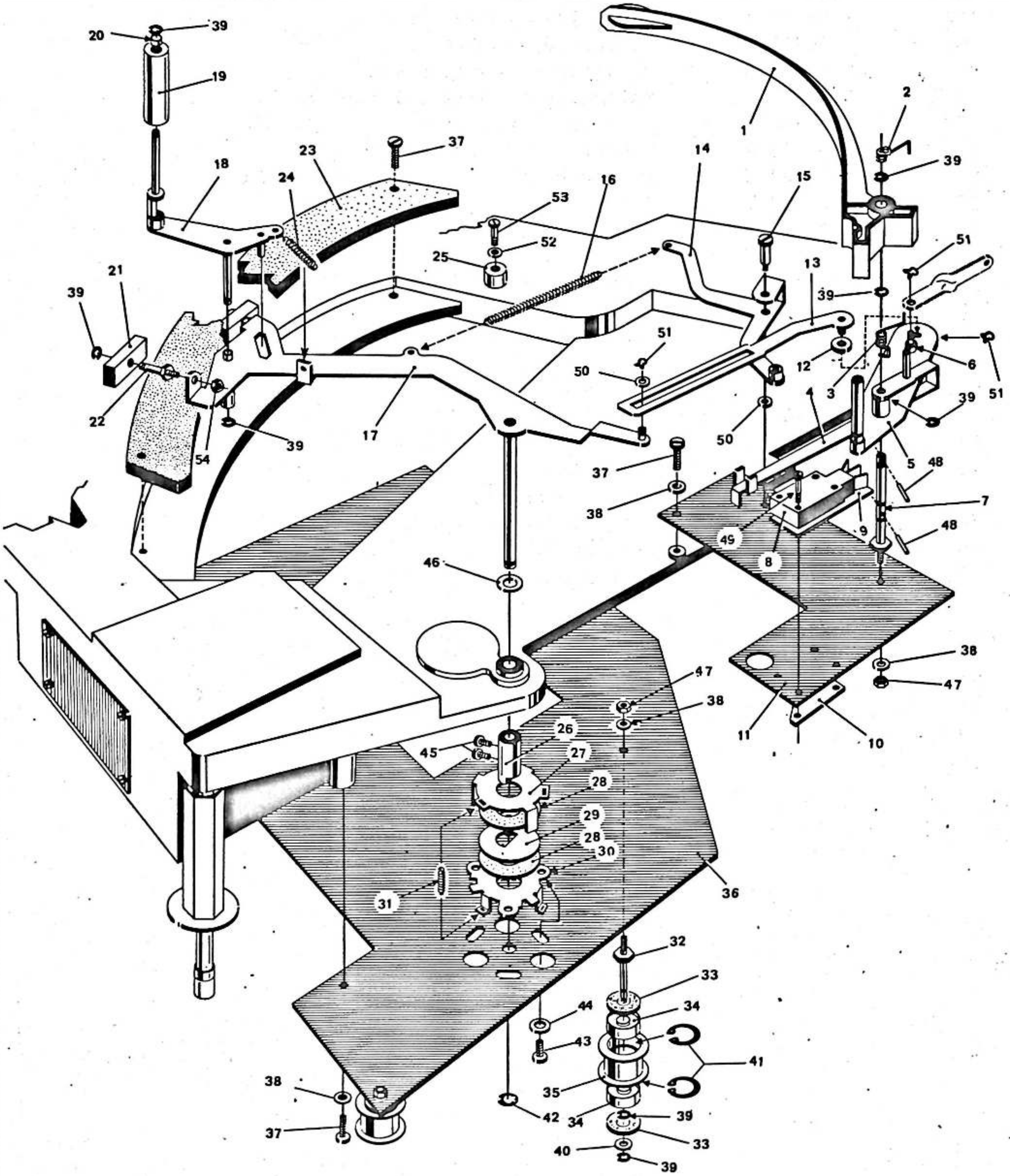
44	9756125 V	Leva microinterruttore 1° - 2° velocità
45	9756111 T	Perno leva posizionatore
46	9756100 D	Albero del cambio
47	9756098 Q	Puleggia riavvolgimento
48	9756099 L	Puleggia condotta del cambio
49	9756114 Y	Cinghia 2° velocità
50	9756113 B	Cinghia 1° velocità
51	9756143 E	Puleggia albero avanzamento banda
52	9921352 L	Vite TP 3,5MAx11
53	6313112 E	Grano TCE 4MAx8
54	9920303 W	Vite TC 3MAx6
55	6337109 D	Staffa elastica
56	9940357 J	Rondella ∅ 3,6
57	9938351 F	Dado 3,5MA
58	9920215 A	Vite TC 2,6MAx20,5
59	6337111 Y	Staffa elastica
60	9922302 F	Vite bloccaggio TC 3MAx4,4
61	9938405 Z	Dado 4MA
62	9940427 Z	Rondella ∅ 4
63	6337107 L	Staffa elastica
64	9920404 V	Vite TC 4MAx10
65	9925351 H	Vite TE 3,5MAx6
66	6337106 Q	Staffa elastica
67	9920358 D	Vite TC 3,5x17
68	9922351 L	Vite bloccaggio TC 3,5MAx5
69	9922352 Y	Vite bloccaggio TC 3,5MAx6,5
70	9920353 P	Vite TC 3,5MAx7
71		Rondella ∅ 4,2 M3-Y77
72	6337114 V	Staffa elastica

GENERAL ELECTRIC
Servizio Tecnico

LEVISMI BOBINA DESTRA

FL 400/500 P. 30

Catalogo PR.



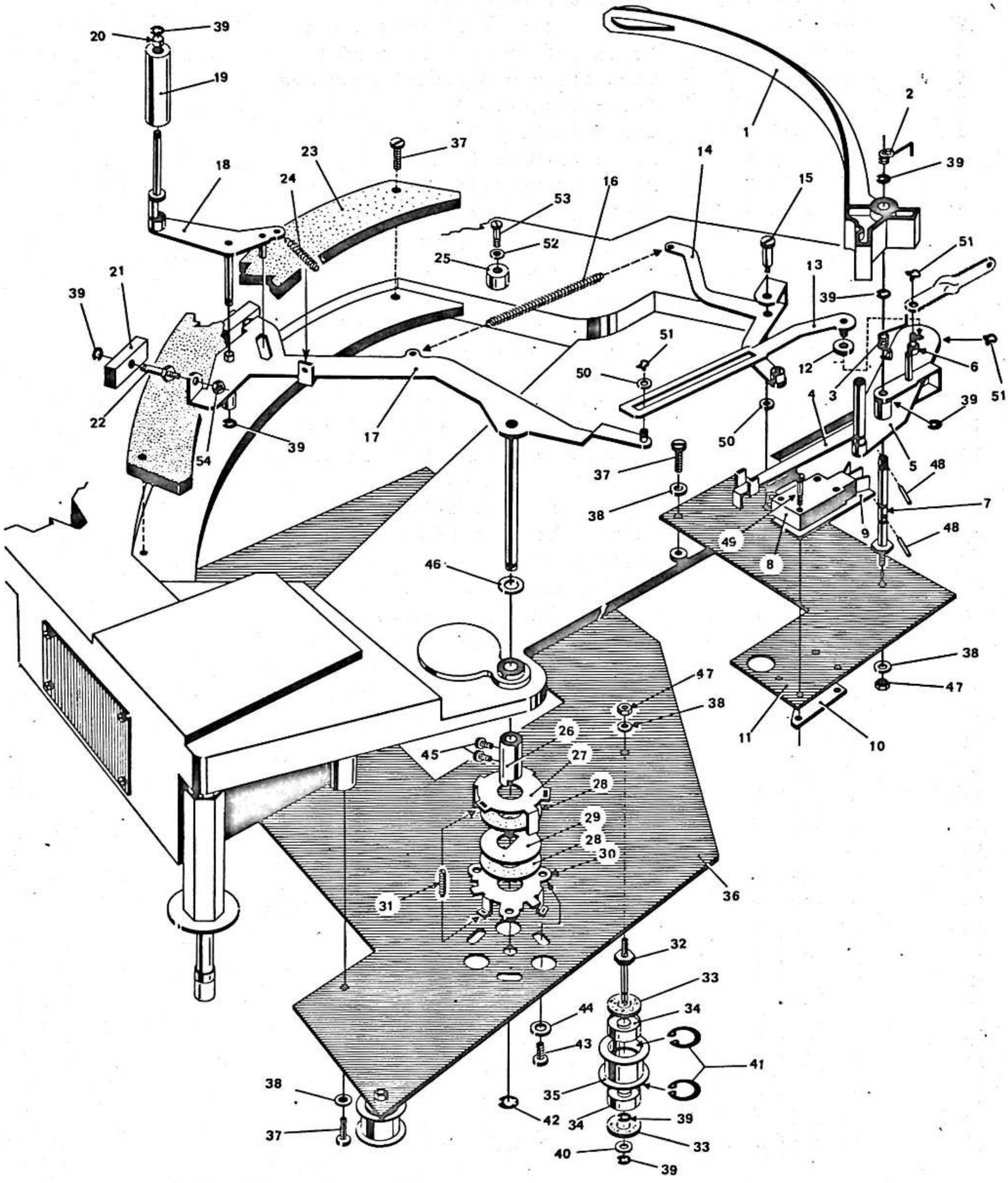
LEVISMI BOBINA DESTRA

1	9756164 V	Braccio fine carta
2	9756181 A	Molla per braccio fine carta
3	9756182 N	Molla per braccio fine carta
4	9756166 D	Leva comando microinterruttore
5	9756172 D	Camma ricupero
6	9940336 L	Distanziale ø 7/3,5x3,2
7	9756175 S	Perno braccio fine carta
8	9705333 C	Microinterruttore
9	9705303 M	Piastrina isolante
10	9705304 A	Piastrina fissaggio
11	9756163 G	Piastra supporto
12	9940348 E	Distanziale ø 3,6
13	9756176 E	Tirante ricupero braccio destro
14	9756173 H	Leva per molla braccio destro
15	9926343 U	Stud
16	9756184 F	Molla braccio ammortizzatore
17	9756199 D	Braccio ammortizzatore destro
18	9756196 Q	Bilanciere destro braccio ammortizzatore
19	9756157 G	Rullino dei bilancieri
20	9756193 N	Boccola rullino bilancieri
21	9756130 V	Pattino braccio ammortizzatore
22	9756129 W	Perno eccentrico
23	9756192 P	Piastra di guida
24	9756183 J	Molla bilanciere braccio
25	9756140 V	Distanziale arresto bracci
26	9756158 V	Mozzo della frizione per braccio
27	9755322 Y	Flangia della frizione
28	9755324 X	Suberit per frizione
29	9755323 U	Disco trascinato frizione
30	9755321 L	Flangia frizione
31	9755325 M	Molla frizione piatto
32	9756148 U	Perno galoppino
33		Rondella feltro
34	9755450 Q	Cuscinetto ø 16/5x5
35	9756147 F	Galoppino trasmissione inferiore
36	9756141 W	Piastra inferiore destra
37	9920404 V	Vite TC 4MAx10
38	9940427 Z	Rondella ø 4,2
39	6337107 L	Staffa elastica
40	9940402 E	Rondella ø 4
41	6337510 F	Staffa elastica
42	6337111 Y	Staffa elastica
43	9920351 F	Vite TC 3,5MAx5
44	9940357 J	Rondella ø 3,6

GENERAL ELECTRIC
Servizio Tecnico

LEVISMI BOBINA DESTRA

FL 400/500 P. 32
Catalogo PR.



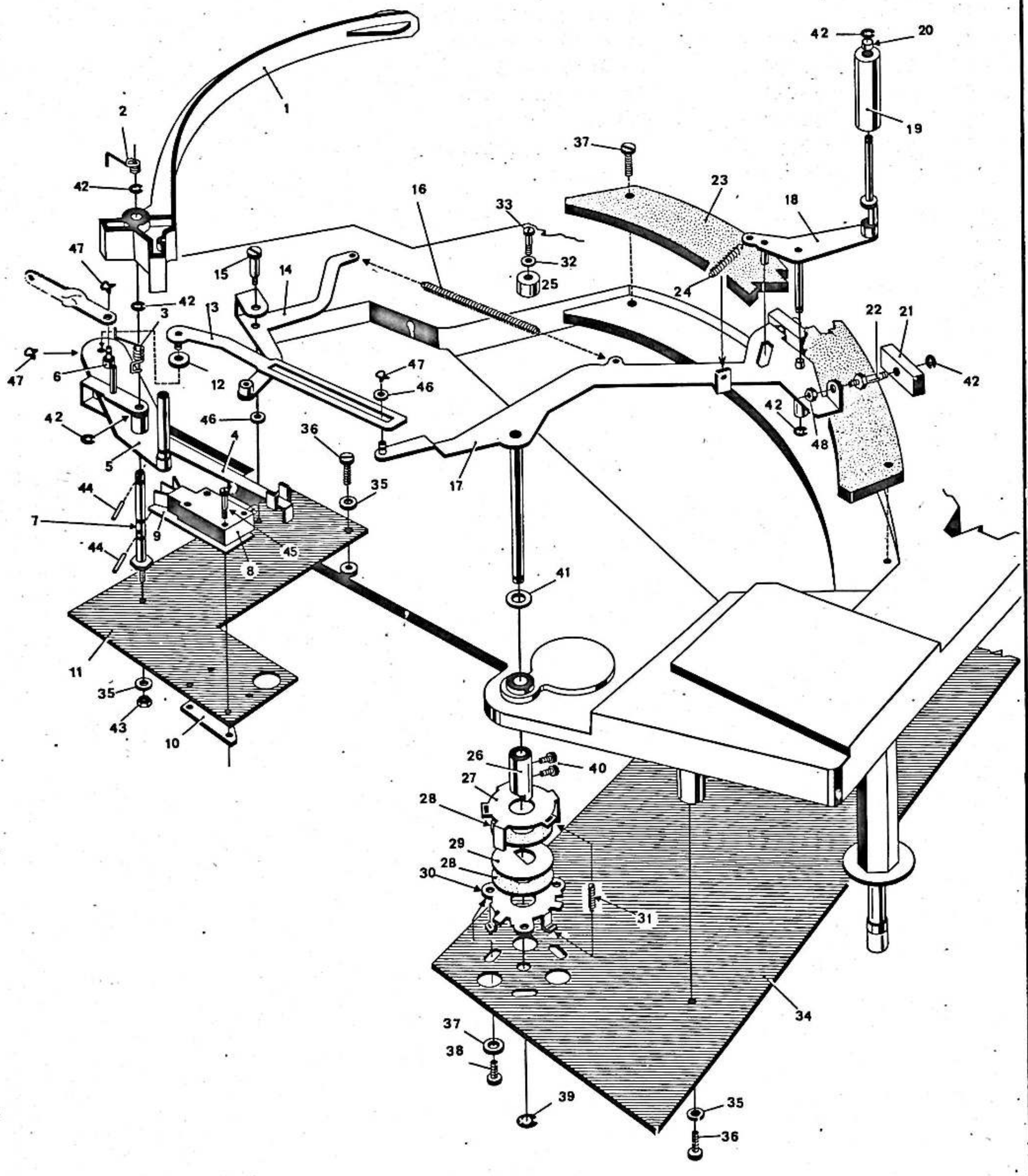
2/1966 4.840.5.038.0

Mod. 0100 A

LEVISMI BOBINA DESTRA

45	9922302 F	Vite bloccaggio TC 3MAx4,4
46	9940502 G	Rondella Ø 5
47	9938405 Z	Dado 4MA
48		Spina elastica Tessal Ø 1x10
49	9920215 A	Vite TC 2,6MAx20,5
50	9940303 Y	Rondella Ø 3
51	9945221 E	Staffa elastica
52	9940348 E	Rondella Ø 3,5
53	9920357 Q	Vite TC 3,5MAx12
54	9938305 P	Dado 3MA

LEVISMI BOBINA SINISTRA



GENERAL ELECTRIC
Servizio Tecnico

LEVISMI BOBINA SINISTRA

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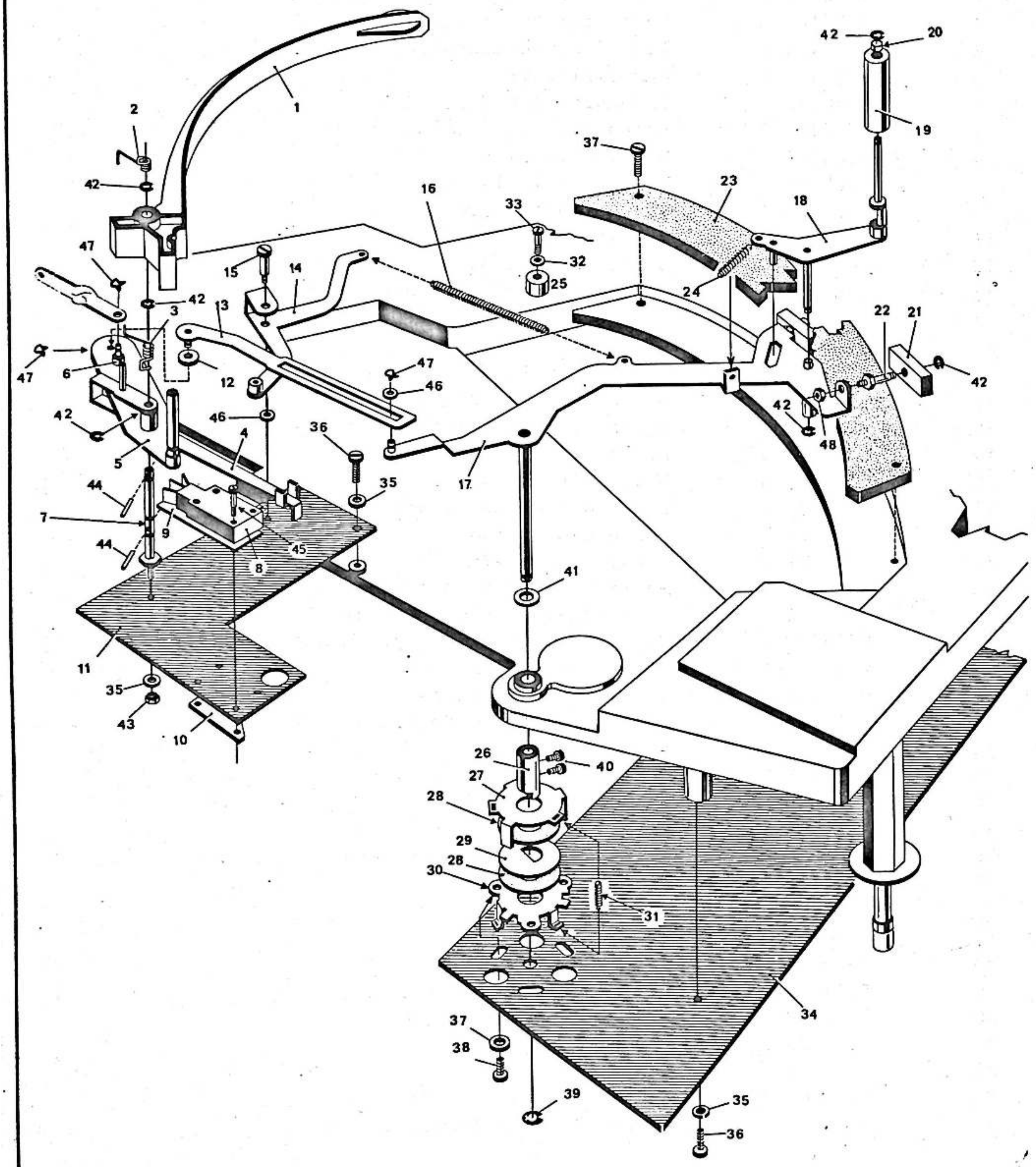
Catalogo PR.

1	9756164 V	Braccio fine carta
2	9756182 N	Molla per braccio fine carta
3	9756181 A	Molla per braccio fine carta
4	9756166 D	Leva comando microinterruttore
5	9756172 D	Camma ricupero
6	9940336 L	Distanziale ø 7/3,5x3,2
7	9756175 S	Perno braccio fine carta
8	9705333 C	Microinterruttore
9	9705303 M	Piastrina isolante
10	9705304 A	Piastrina fissaggio
11	9756163 G	Piastra supporto
12	9940348 E	Distanziale ø 3,6
13	9756189 C	Tirante ricupero braccio sinistro
14	9756174 W	Leva per molla braccio sinistro
15	9926343 U	Stud
16	9756184 F	Molla braccio ammortizzatore
17	9756200 F	Braccio ammortizzatore sinistro
18	9756197 L	Bilanciere sinistro braccio ammortizzatore
19	9756157 G	Rullino dei bilancieri
20	9756193 N	Boccola rullino bilancieri
21	9756130 U	Pattino braccio ammortizzatore
22	9756129 W	Perno eccentrico
23	9756192 P	Piastra di guida
24	9756183 J	Molla bilanciere braccio
25	9756140 V	Distanziale arresto bracci
26	9756158 V	Mozzo della frizione per braccio
27	9755322 Y	Flangia della frizione
28	9755324 X	Suberit per frizione
29	9755323 U	Disco trascinato frizione
30	9755321 L	Flangia frizione
31	9755325 M	Molla frizione piatto
32	9940348 E	Rondella ø 3,5
33	9920357 Q	Vite TC 3,5 MAx12
34	9756142 A	Piastra inferiore sinistra
35	9940427 Z	Rondella ø 4,2
36	9920404 V	Vite TC 4MAx10
37	9940357 J	Rondella ø 3,6
38	9920351 F	Vite TC 3,5MAx5
39	6337111 Y	Staffa elastica
40	9922302 F	Vite bloccaggio TC 3MAx4,4
41	9940502 G	Rondella ø 5
42	6337107 L	Staffa elastica
43	9938405 Z	Dado 4MA
44		Spina elastica Tessal ø 1x10

GENERAL ELECTRIC *Servizio Tecnico*	LEVISMI BOBINA SINISTRA	FL 400/500	P. 36
		Catalogo PR.	

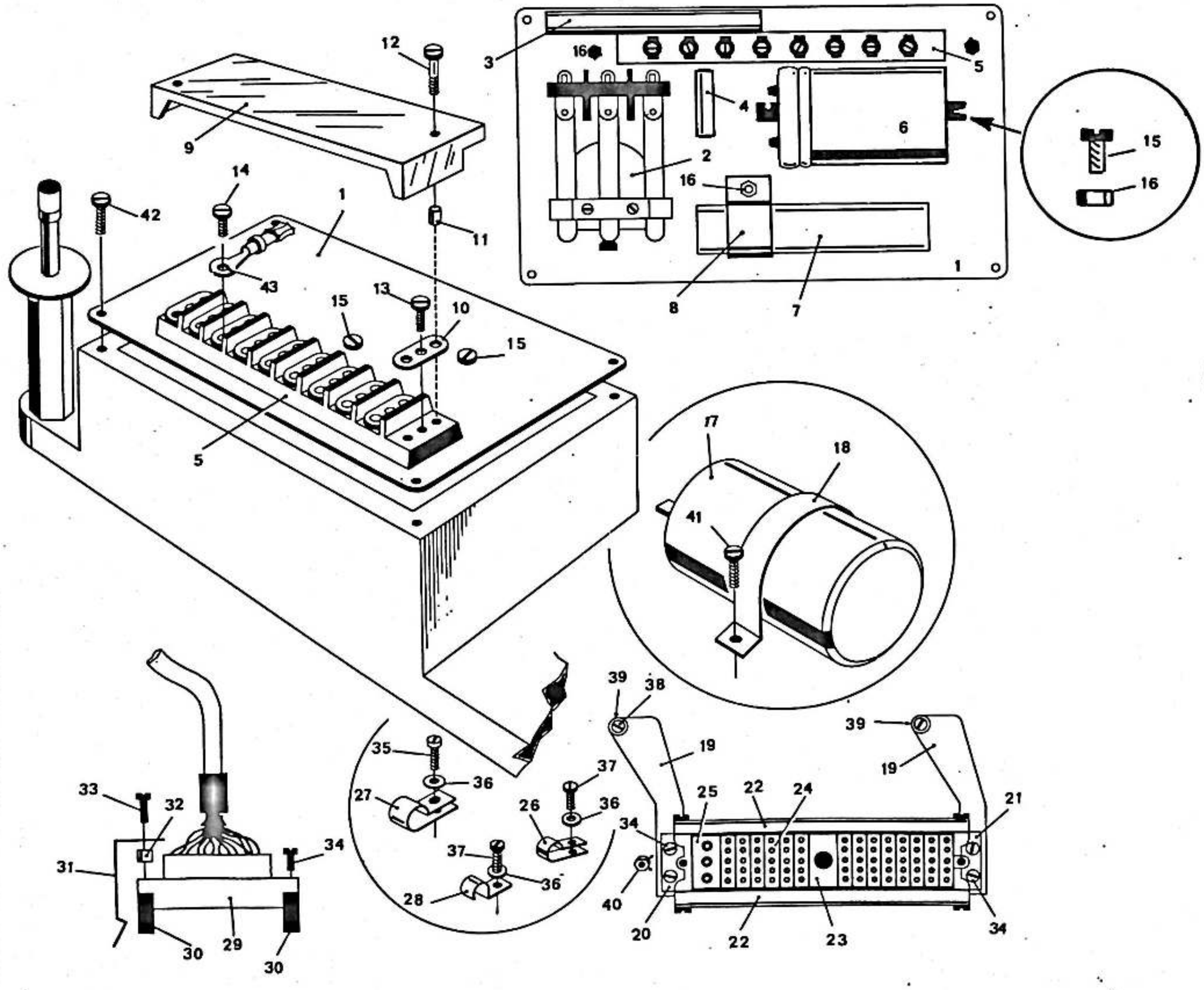


2/1966	4.840.5.042.0

LEVISMI BOBINA SINISTRA

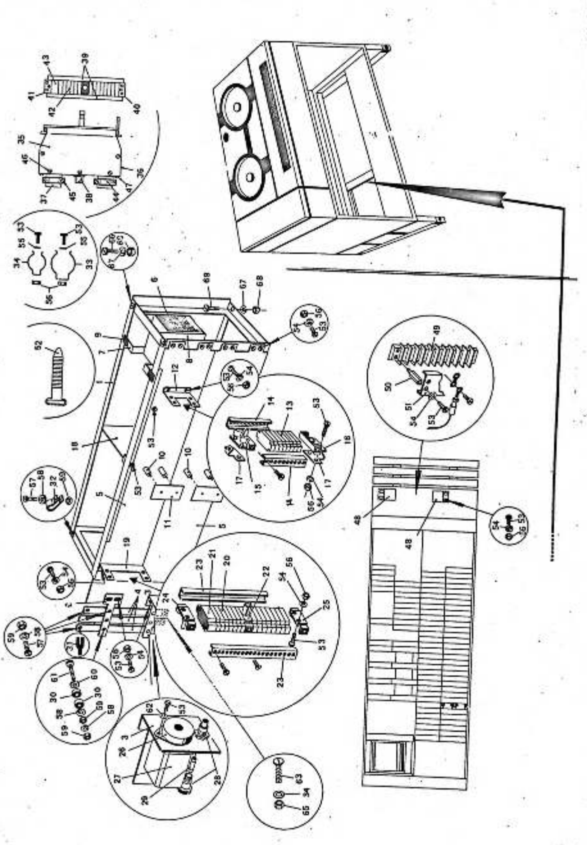
45	9920215 A	Vite TC 2,6MAx20,5
46	9940303 Y	Rondella ∅ 3
47	9945221 E	Staffa elastica
48	9938305 P	Dado 3MA

FILTRO - CONNETTORI



	9755202 G	AG. Gruppo filtro rete
1	9755192 B	Piastrina supporto morsettiera
2	9755200 T	Relè motore 24 V.
3		Doppio shock T2-CM 176/C
4	4942696 U	Resistenza 47 Ohm - 1W - 10%
5	9709439 D	Morsettiera 8+2 posti
6	9709477 L	Condensatore 0,5 /uF - 2000 Vp
7	9488192 M	Filtro per relè
8	9709184 B	Staffa filtro
9	9709458 F	Protezione morsettiera
10	9709168 S	Piastrina
11	9702201 N	Distanziale
12	9702202 S	Vite TC 3MA speciale
13	9920312 P	Vite TC 3MAx11
14	9920304 K	Vite TC 3MAx5
15	9920305 P	Vite TC 3MAx7
16	9938307 X	Dado 3MA
17	9727397 R	Condensatore 5 /uF 400 V.L. (50 Hz)
	9727338 C	Condensatore 12,5 /uF 280 V.L. (60 Hz)
18	9727338 C	Staffa condensatore T2-D163
19	9755193 F	Piastrina supporto
20	5616412 N	Squadretta d'estremità maschio
21	5616414 F	Squadretta d'estremità femmina
22	5616419 C	Rotaia di guida
23	5616418 G	Estrattore femmina
24	5616402 Z	Connettore maschio 5 piedini
25	5616406 S	Connettore maschio 3 piedini
26	5618052 C	Staffetta fermacavo nylon
27	5618054 V	Staffetta fermacavo nylon
28	9708087 S	Staffetta fermacavo metallica
29	5616127 E	Connettore Amphenol femmina
30	9756059 G	Piastrina fissaggio morsettiera
31	9757048 F	Linguetta di bloccaggio
32	9940336 L	Distanziale ∅ 7/3,5x3,2
33	9920312 P	Vite TC 3MAx11
34	9920307 X	Vite TC 3MAx9
35	9920357 Q	Vite TC 3,5MAx12
36	9940357 J	Rondella ∅ 3,6
37	9920354 C	Vite TC 3,5MAx9
38	9920404 V	Vite TC 4MAx10
39	9940427 Z	Rondella ∅ 4,2
40	9938307 X	Dado 3MA
41	9920356 L	Vite TC 3,5MAx10,5
42	9920353 P	Vite TC 3,5MAx7
43	9953301 S	Capocorda
-	5622420 A	Cartone isolante

GENERAL ELECTRIC *Servizio Tecnico*	ATTUAZIONE	FL 400/500	P. 40
		Catalogo PR.	

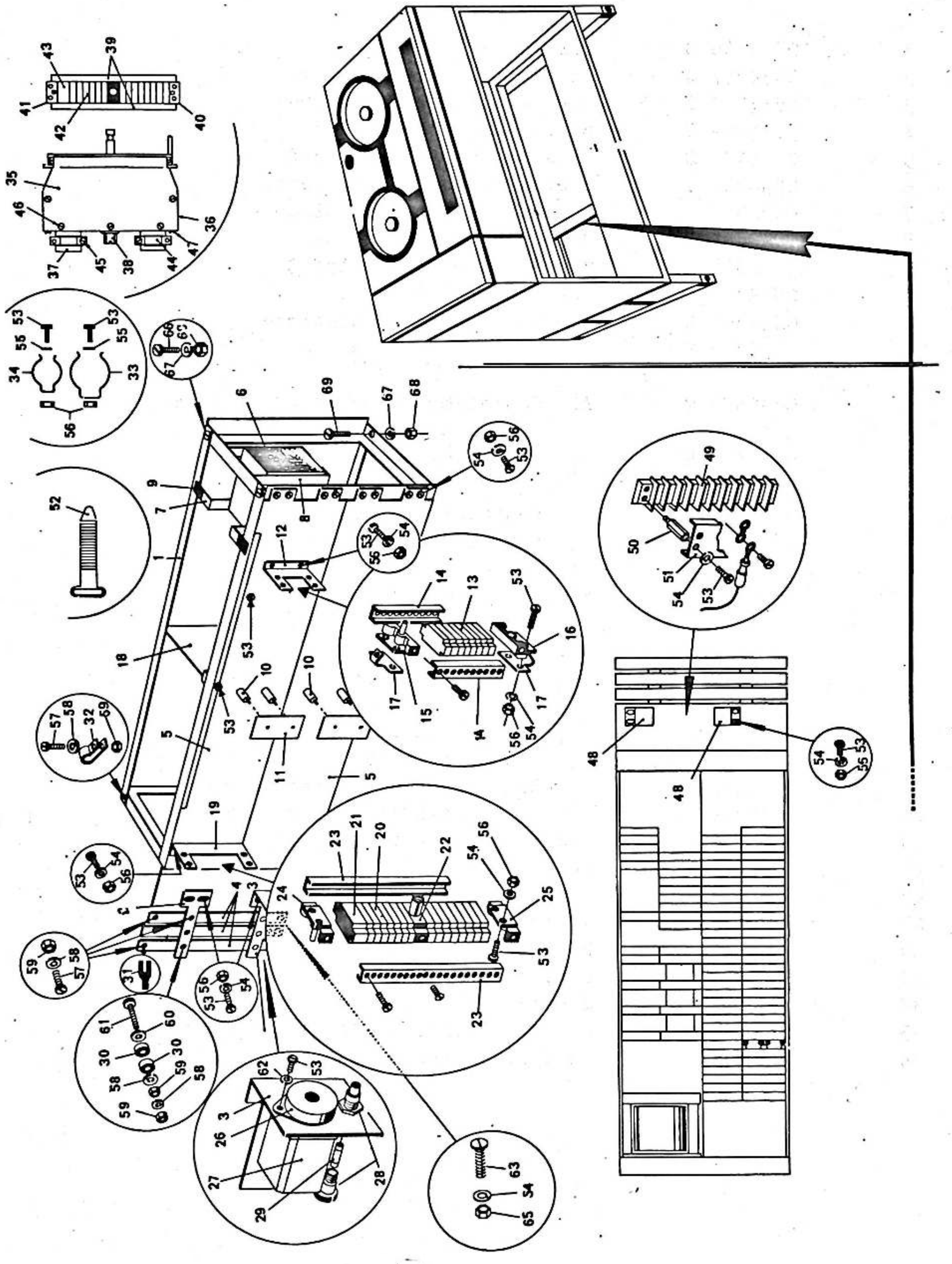


2/1966	4.840.5.046.0

Mod. 0100 A

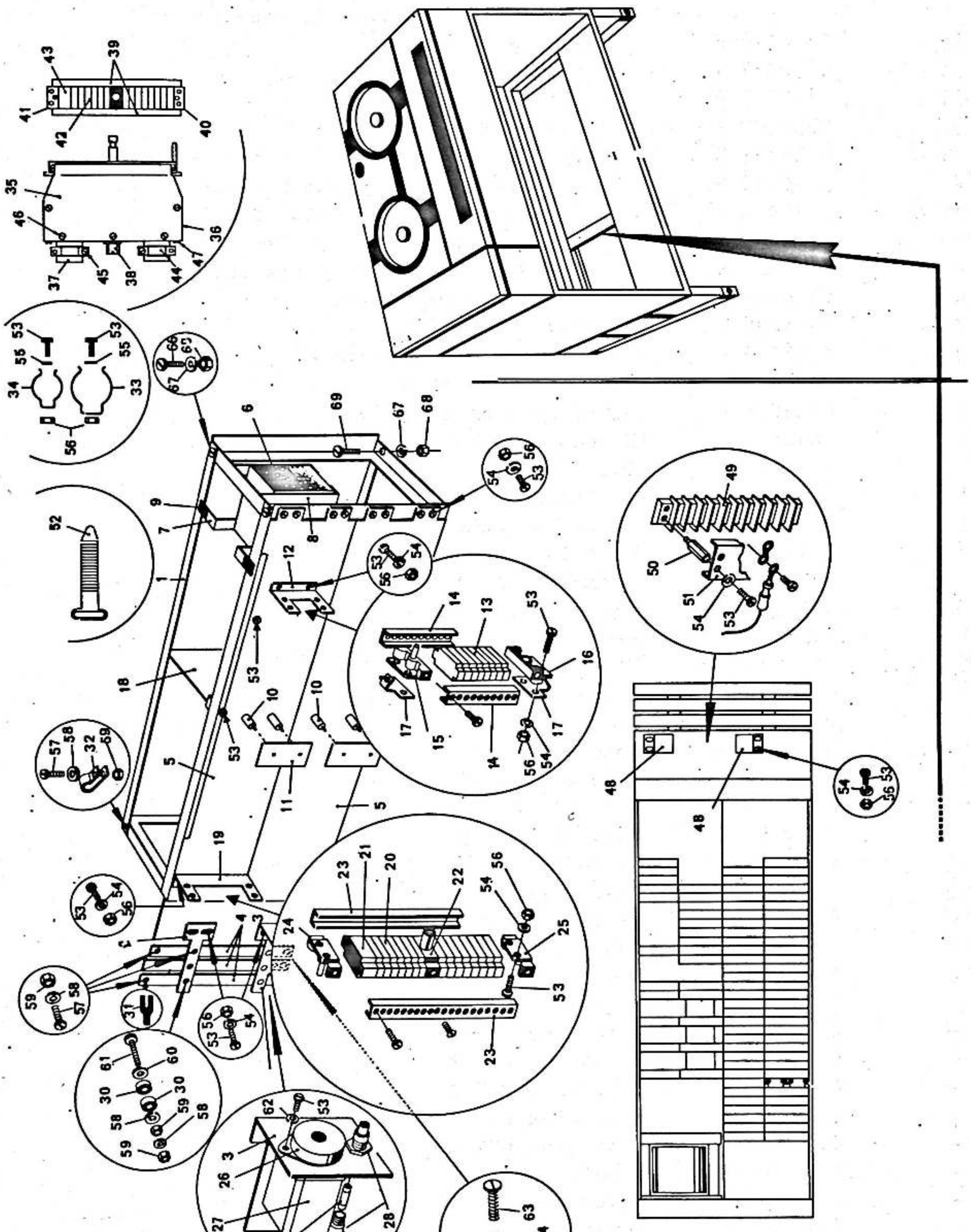
1	0835168 B	Telaio
2	0834257 Q	Supporto superiore barre
3	0834260 F	Supporto inferiore barre
4	0834259 H	Barra di alimentazione
5	0835139 H	Piastra forata a 2 righe
6	0636058 D	Bobina volano con supporti
7	0834595 S	Supporto sinistro bobina
8	0834596 E	Supporto destro bobina
9	5621698 G	Gommino terminale tipo 3
10	0834478 K	Distanziale
11	0834397 W	Targhetta immatricolazione
12	0830384 K	Supporto connettore
	0830629 Q	AG. Connettore maschio 40 piedini
13	5616402 Z	Connettore maschio 5 piedini
14	0830487 H	Rotaia di guida
15	5616412 N	Squadretta di estremità maschio
16	5616414 F	Squadretta di estremità femmina
17	5616448 B	Linguetta di bloccaggio
18		Divisorio
19	0830383 W	Supporto connettore
		AG. Connettore maschio 73 piedini
20	5616402 Z	Connettore maschio 5 piedini
21	5616406 S	Connettore maschio 3 piedini
22	5616418 G	Estrattore femmina
23	0830493 H	Rotaia di guida
24	5616412 N	Squadretta di estremità maschio
25	5616414 F	Squadretta di estremità femmina
26	5678266 X	Zoccolo 11 piedini
27	5322432 A	Relè 24 V. - 500 Ohm
28	5376124 J	Portafusibile
29	5373175 N	Fusibile 8 A
30	0834229 E	Rondella isolante
31	5613350 W	Capocorda
32	5618054 V	Staffa per cavo
33	0000646 N	Agraffe Prestola STAR tipo 500/12 (grande)
34	0000472 L	Agraffe Prestola STAR tipo 500/8 (piccola)

ATTUAZIONE



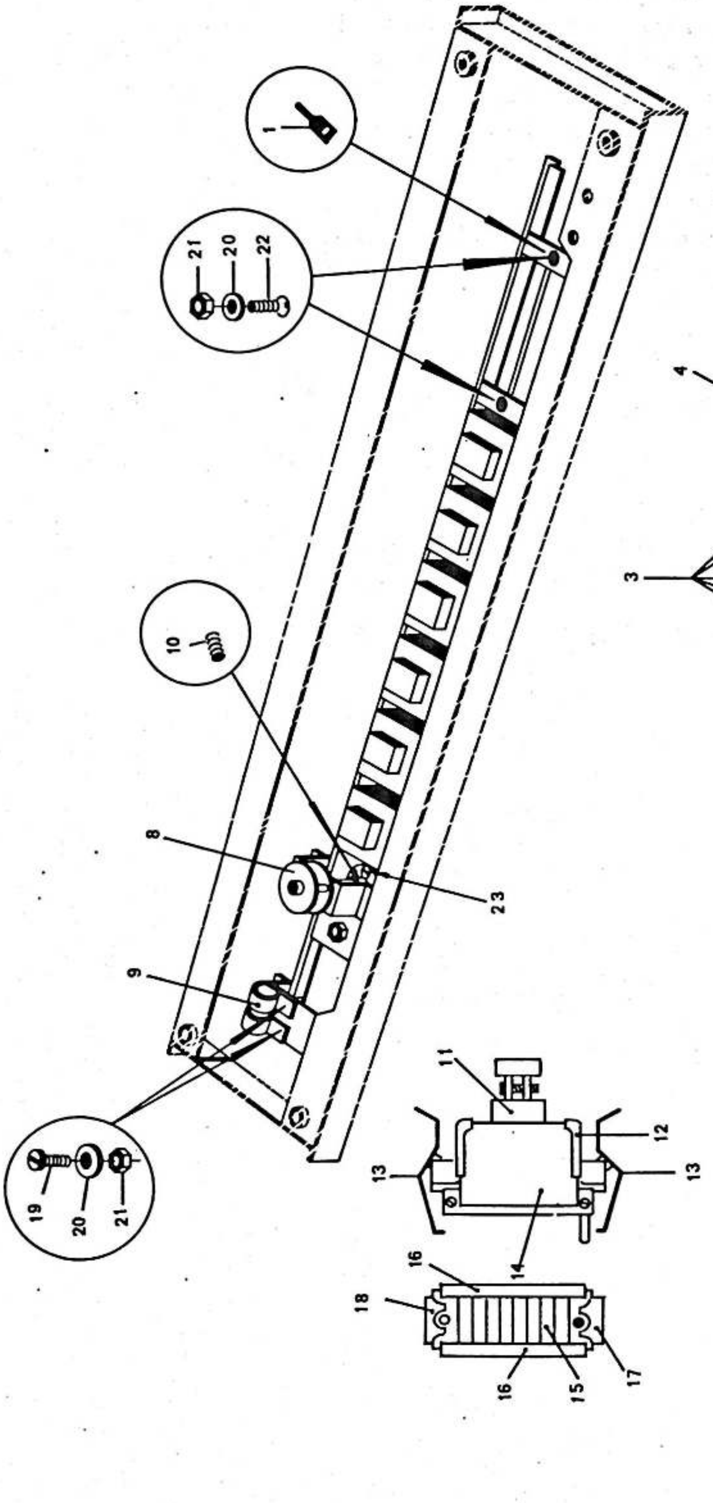
			AG. Connettore femmina 73 piedini
35	0830378	B	Parete laterale
36	0830377	N	Parete di testa
37	0830313	P	Parete superiore
38	0830480	X	Estrattore maschio
39	0830493	H	Rotaia di guida
40	5616412	N	Squadretta di estremità maschio
41	5616414	F	Squadretta di estremità femmina
42	5616404	J	Connettore femmina 5 piedini
43	5616408	K	Connettore femmina 3 piedini
44	0830312	K	Piastrina serracavi
45	6311236	W	Vite TC 3MAx20
46	1925544	P	Vite autofilettante ø 3,58x6,35
47	0680112	F	Vite TC 2,6MAx6
48	0834258	D	Squadretta morsettiera
49	5612550	E	Morsettiera 10+2 porti
50	0834243	N	Distanziale
51	0834256	L	Protezione morsettiera
52	5618071	S	Serracavi Colson tipo C 42
53	6311231	R	Vite TC 3MAx8
54	6332103	N	Rondella elastica ø 3,2
55	6332303	J	Rondella dentata ø 3,2
56	6321103	H	Dado 3MA
57	0680534	A	Vite ottone TC 4MAx10
58	0683081	S	Rondella elastica bronzo [illegible]
59	0682260	E	Dado ottone 4MA
60	0682546	Y	Rondella bronzo ø 4,2
61	0680551	F	Vite ottone TC 4MAx18
62	6331103	A	Rondella ø 3,2
63	6314143	V	Vite TC 8MAx15
64	6332108	C	Rondella ø 8,4
65	6321108	X	Dado 8MA
66	6311255	L	Vite TC 5MAx8
67	6332105	F	Rondella elastica ø 5,3
68	6321105	S	Dado 5MA
69	6311257	U	Vite TC 5MAx12
-	0611500	F	Piastrina NOR A
-	0611501	G	Piastrina NOR E
-	0611502	L	Piastrina NOR I
-	0613231	A	Piastrina FOT 1
-	0613232	D	Piastrina FOT 2
-	0613230	Y	Piastrina AFOT
-	0612021	H	Piastrina FLIP B
-	0615220	Q	Piastrina SIM A

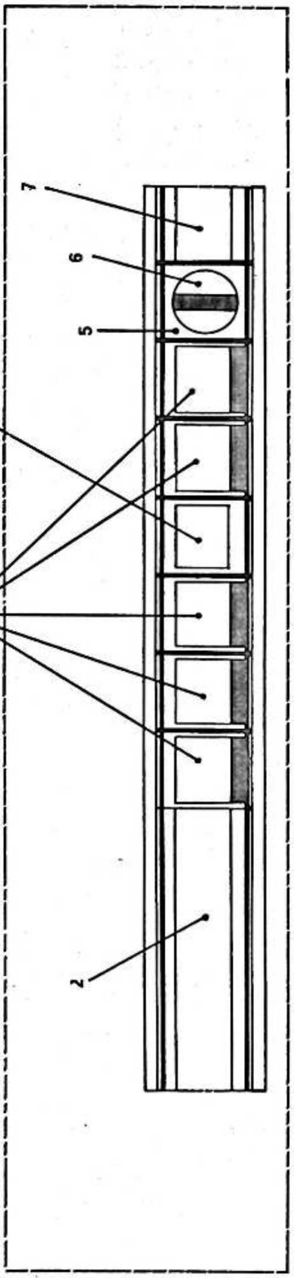
GENERAL ELECTRIC *Servizio Tecnico*	ATTUAZIONE	FL 400/500 P. 44 Catalogo PR.



-	0616033 K	Piastrina FICO B
-	0616035 C	Piastrina FOCA
-	0617231 S	Piastrina CIRE
-	0613233 H	Piastrina FOT 3
-	0613234 W	Piastrina FOT 4
-	5621696 S	Gommino terminale tipo 1
-	0839999 U	Striscia numerata 1+40
-	0834008 Z	Bandella di massa
-	0834007 C	Bandella di alimentazione
-	0834009 V	Nastro isolante
-	5710305 Y	Wire wrap
-	0834000 S	Connettore Socapex maschio

PANNELLO COMANDI





PANNELLO COMANDI

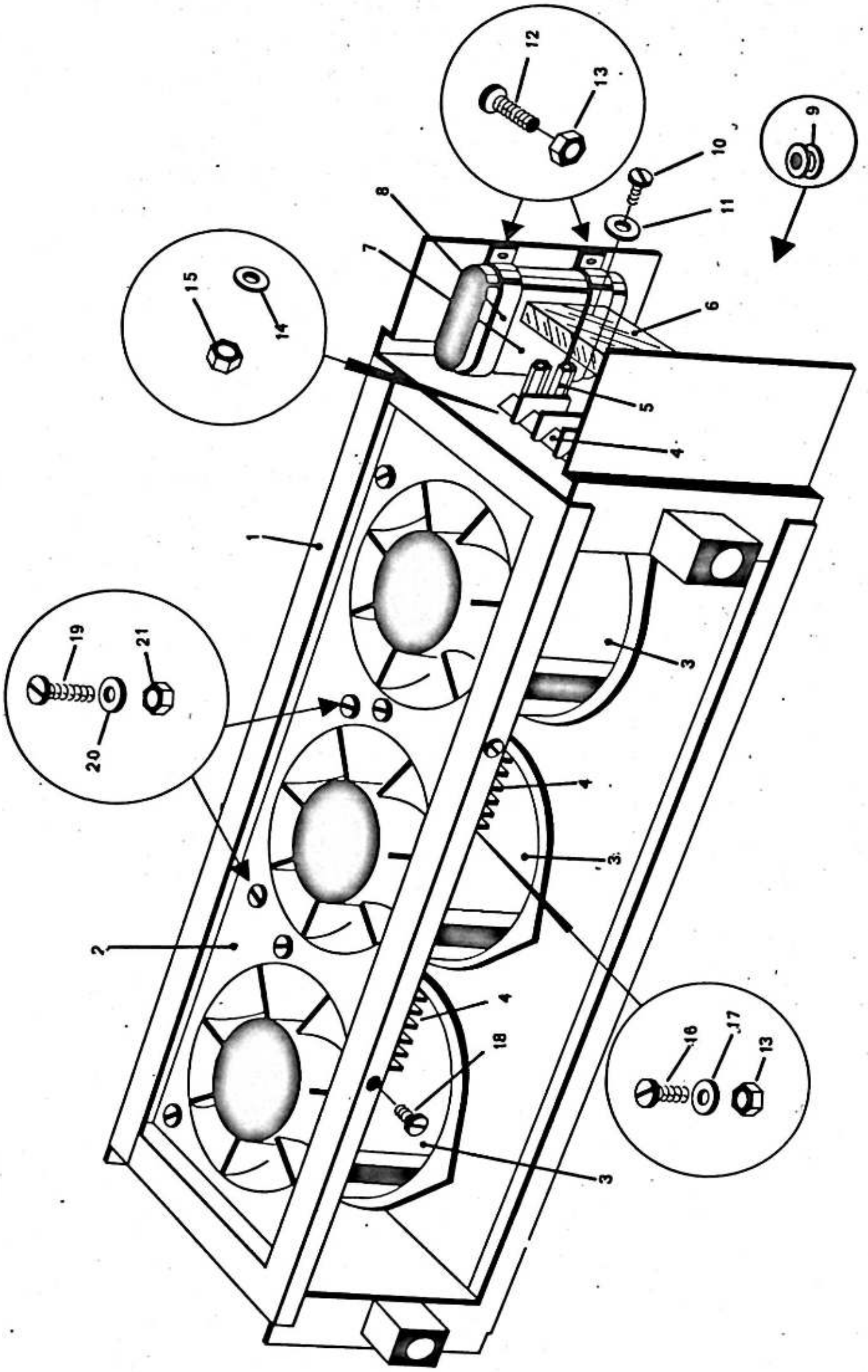
1	5613328 S	Capicorda
2	0670583 R	Riempimento laterale
3	5141402 D	Pulsante monostabile con lampadino
4	0000634 D	Spia luminosa con lampadino
5	0670593 J	Blocchetto manopola
6	0670592 N	Assieme manopola
7	0835509 S	Riempimento trasversale
8	0000633 Q	Commutatore 2 vie - 5 posizioni
9	5618054 V	Staffa per cavo
10	6316101 D	Grano CE 3MAx5
11	5616425 C	Serracavo connettore
12	5616423 K	Squadretta protezione
13	5616448 B	Linguetta di bloccaggio
14	0830353 K	Protezione
15	5616404 J	Connettore femmina 5 piedini
16	0830487 H	Rotaia di guida
17	5616412 N	Squadretta di estremità maschio
18	5616414 F	Squadretta di estremità femmina
19	6311232 V	Vite TC 3MAx10
20	6331103 A	Rondella Ø 3,2
21	6321103 H	Dado 3MA
22	6312733 P	Vite TP 3MAx8
23	6311230 Q	Vite TC 3MAx6
-	0831751 L	Serie targhette indicazione
-	5574277 Z	Lampadino segnalazione 24 V.

GRUPPO VENTILAZIONE

FL 400/500

P. 48

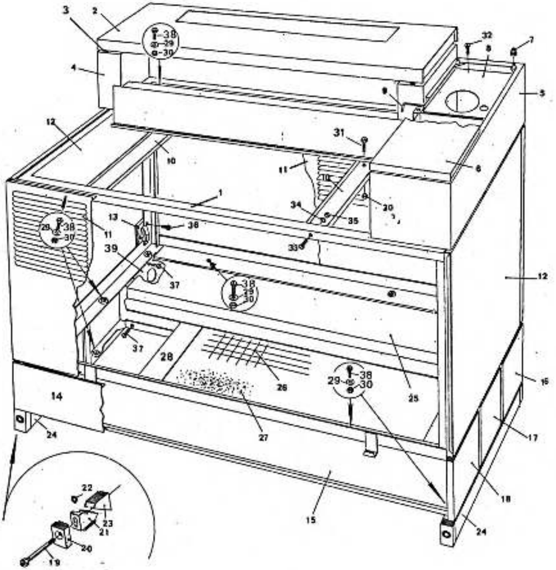
Catalogo PR.



GRUPPO VENTILAZIONE

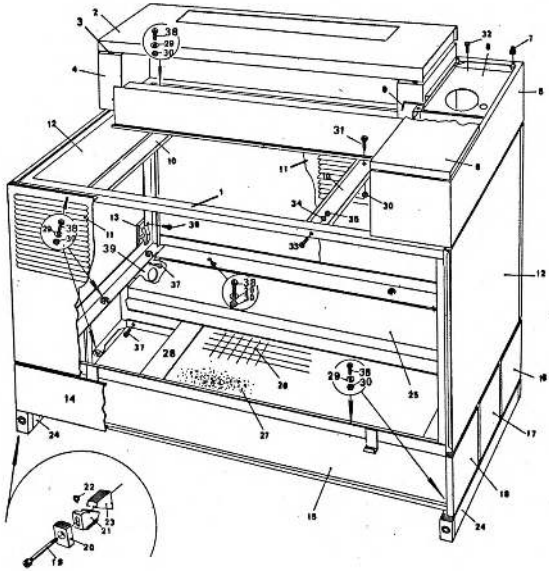
1	0835171 B	Telaio ventilatori
2	0835182 P	Piastra superiore
3	6550200 G	Ventilatore 220V - 50Hz
	0000723 R	Ventilatore 115V - 60Hz
4	5612430 A	Morsettiera 5+2 passi
5	0834243 N	Colonnetta distanziale
6	0834283 S	Protezione morsettiera
7	5013420 A	Condensatore 4 µF - 280 VL - 5%
8	0834263 Q	Staffa condensatore
9	5618228 N	Gommino passacavo
10	6311231 R	Vite TC 3MAx8
11	6331103 A	Rondella Ø 3,2
12	6311232 V	Vite TC 3MAx10
13	6321103 H	Dado 3MA
14	6332104 B	Rondella elastica Ø 4,3
15	6321104 W	Dado 4MA
16	6311234 N	Vite TC 3MAx15
17	6332103 N	Rondella elastica Ø 3,2
18	0680510 A	Vite autofilettante TC 6Px6,35
19	6311258 R	Vite TC 5MAx15
20	6332105 F	Rondella elastica Ø 5,3
21	6321105 S	Dado 5MA
-	5613350 W	Capocorda

CARROZZERIA



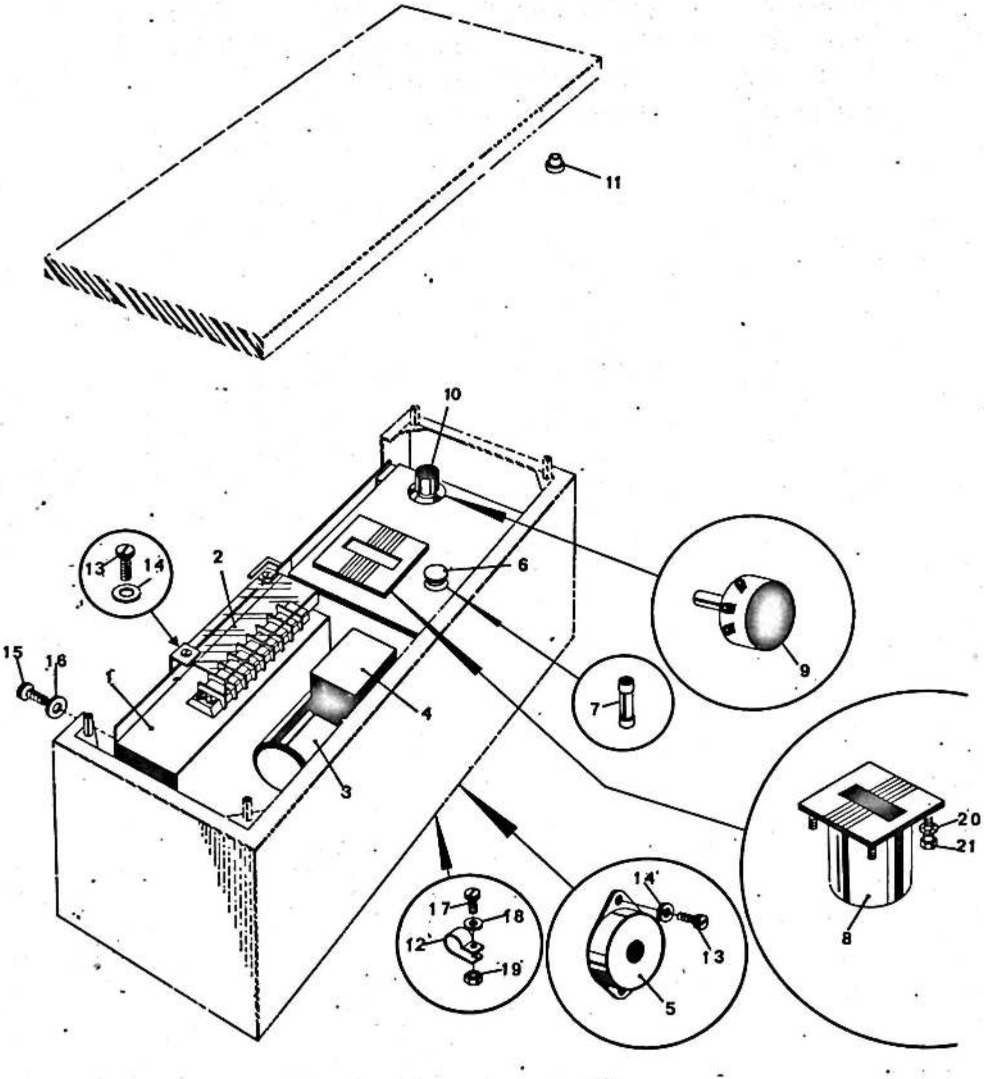
1	0835494 J	Gruppo saldato
-	0835495 U	AG. Complessivo elemento trasversale
2	0835499 V	Gruppo coperchio elemento trasversale
3	9431035 Y	Gommino
4	0835768 L	Gruppo elemento trasversale
-	0835496 G	AG. Gruppo elemento laterale
5	0835760 M	Gruppo elemento fisso
6	0835761 N	Coperchio elemento fisso
7	9431035 Y	Gommino
8	0835521 N	Supporto contaore
9	0835520 M	Perno per supporto contaore
10	0835767 X	Traversa mobile
11	0835774 L	Pannello grigliato anteriore e posteriore
12	0834648 L	Pannello laterale generico
13	0834643 W	Gancio in plastica per pannelli foro ∅ 3,2
	0834670 Q	Gancio in plastica per pannelli foro ∅ 2
14	0834632 Z	Pannello frontale per canale cavi verniciato bianco
	0834673 Z	Pannello frontale per canale cavi verniciato antracite
15	0834634 J	Ponticello per canale cavi verniciato bianco
	0834676 W	Ponticello per canale cavi verniciato antracite
16	0834629 N	Gamba generica
17	0834628 T	Gruppo gamba ponticello
18	0834630 L	Pannello testata canale cavi verniciato bianco
	0834674 N	Pannello testata canale cavi verniciato antracite
-	0834620 K	AG. Piedino regolabile
19	0834619 M	Vite di regolazione
20	0834618 R	Testata
21	0834616 Y	Piedino con gomma fusa
22	6337116 D	Staffa elastica
23	0834614 Q	Scivolo
24	0834608 U	Parte A (canale per piedino)
-	0835497 C	AG. Gruppo fissaggio elettronica con filtro
25	0835498 Z	Gruppo fissaggio elettronica
26	0835500 X	Rete per filtro
27	0835501 Y	Elemento filtrante
28	0835519 P	Gruppo cassetta porta filtro

CARROZZZERIA



29	6331105	T	Rondella Ø 5,3
30	6321105	S	Dado 5 MA
31	6314114	P	Vite TE 5MAx10
32	6311257	U	Vite TC 5MAx12
33	6311243	S	Vite TC 4MAx10
34	6331104	X	Rondella Ø 4,3
35	6321104	W	Dado 4MA
36	0005052	M	Vite autofilettante TC Ø 2,9x4,8
37	0005051	H	Vite autofilettante TC Ø 3,9x6,5
38	6314115	K	Vite TE 5MAx12
39	0834635	N	Pannello per gambe

ALIMENTATORE LAMPADA



1	5432205	F	Stabilizzatore a ferro saturo 7,5V. ± 2% - 30W
2	0834289	L	Protezione morsettiera
3	5027880	B	Condensatore 10 µF - 1000 VL
4	5322432	A	Relé 24V - 500 Ohm
5	5678266	X	Zoccolo 11 piedini
6	5376124	J	Portafusibile
7	5373175	N	Fusibile 8A
8	(5314924	D	Contaore 220V - 50Hz
	(0000905	H	Contaore 115V - 60Hz
9	4997030	B	Reostato 1,5 Ohm - 5,75A
10	5626320	M	Manopola reostato
11	9431035	Y	Gommino
12	5618054	V	Staffa per cavo
13	6311231	R	Vite TC 3MAx8
14	6331103	A	Rondella Ø 3,2
15			Vite TC 8 UNCx10 - 32 fil/1"
16	6332104	B	Rondella elastica Ø 4,3
17	6311243	S	Vite TC 4MAx10
18	6331104	X	Rondella Ø 4,3
19	6321104	W	Dado 4MA
20	6332303	J	Rondella a ventaglio Ø 3,2
21	6321103	H	Dado 3MA
-	5613350	W	Capocorda
-	5621698	G	Gommino per terminale

0835139	H	Piastra forata a due righe
0834007	C	Bandella di alimentazione
0834008	Z	Bandella di massa
0834009	V	Nastro isolante
0834000	S	Connettore Socapex maschio
5710305	Y	Wire wrap
0834396	S	Targhetta immatricolazione
0834478	K	Distanziale targhetta
0834416	U	Targhetta codice
6311231	R	Vite TC 3MAx8
0611500	F	Piastrina NORA
0611501	G	Piastrina NORE
0611502	L	Piastrina NORI
0611503	Q	Piastrina NORS
0612027	J	Piastrina FLIPA
0612020	G	Piastrina FLIPA
0612021	H	Piastrina FLIPB
0612130	S	Piastrina UNIV
0612322	A	Piastrina GEMAC
0615211	Q	Piastrina CAP2
0615212	U	Piastrina CAP3
0615217	Z	Piastrina CAP4
0615213	Y	Piastrina CAL4
0615220	Q	Piastrina SIMA
0616033	K	Piastrina FICOA
0611420	T	Piastrina INPO
0611421	U	Piastrina INCA
0617312	E	Piastrina ALAMA
0618021	I	Piastrina SUSIA

0835139	H	Piastra forata a due righe
0834007	C	Bandella di alimentazione
0834008	Z	Bandella di massa
0834009	V	Nastro isolante
0834000	S	Connettore Socapex maschio
5710305	Y	Wire wrap
0834397	W	Targhetta immatricolazione
0834416	U	Etichetta codice
0834478	K	Distanziale targhetta
6311231	R	Vite TC 3MAx8
0000635	H	Condensatore 6800 pF
5006274	H	Condensatore 680 pF - 200 VL
5037270	W	Condensatore 4,7 /uF - 20 VL
5006396	V	Condensatore 1500 pF - 200 VL
5007800	R	Condensatore 0,47 /uF - 125 VL
5008100	F	Condensatore 0,68 /uF - 125 VL
0611500	F	Piastrina NORA
0611501	G	Piastrina NORE
0611502	L	Piastrina NORI
0611503	Q	Piastrina NORS
0612027	J	Piastrina FLIPA
0612020	G	Piastrina FLIPA
0612322	A	Piastrina GEMAC
0612130	S	Piastrina UNIV
0611420	T	Piastrina INPO
0615211	Q	Piastrina CAP2
0615212	U	Piastrina CAP3
0615220	Q	Piastrina SIMA
0616033	K	Piastrina FICOA
0611421	U	Piastrina INCA
0617312	E	Piastrina ALAMA
0612021	H	Piastrina FLIPB
0615217	Z	Piastrina CAP4
0615213	Y	Piastrina CAL4
0618021	T	Piastrina SUSIA
0612135	U	Piastrina UNRA